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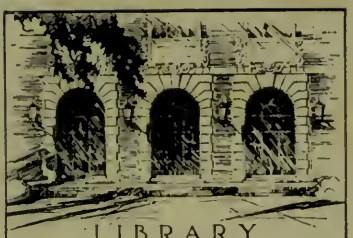

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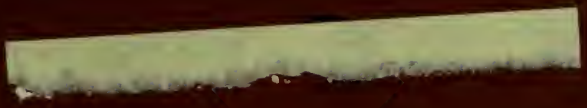

TRANSACTIONS

OF THE

Illinois State Dental Society

AT THE

Thirtieth Annual Meeting,

HELD AT

SPRINGFIELD, MAY 8 to 11, 1894.

Publication Committee:

LOUIS OTTOFY. A. W. HARLAN. E. NOYES.

"ARTEM DOCTRINA SANITATEM ARTE."

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Addresses, Essays and Discussions.

THIRTY YEARS AGO AND NOW.

Annual Address by the President, Garrett Newkirk, M. D., Chicago.

Members of the Illinois State Dental Society:

A visit to Springfield always appeals to my patriotic feelings, and I love to come here. It is the capitol city of our State. It was the home of Abraham Lincoln. On a green hill not far away is now his tomb, where "guarded by heroic bronze" our martyred hero lies.

Next to Mt. Vernon it is the Mecca of American patriotism; and I think this feeling in our hearts is one of the causes bringing us here each second year.

This has been announced as our thirtieth annual meeting, and I dare say many of you have the same impression which I had at first, that the society is now thirty years old. But I have learned that the count begins with the meeting of organization in July, 1865; so that the society is really twenty-nine years old, lacking two months.

This society was organized about one month after the last surrender at the close of the great civil conflict. In that conflict many of its earlier members had been engaged. How many I have never known until recently, and I think no one has ever attempted an enumeration. Soon after I had joined the society, in 1880, I learned incidentally of several, and as the years went by I heard of others. Many of the facts which came to my knowledge from time to time were very interesting, and some of the personal experiences not merely interesting but thrilling!

It may seem to some of you a foolish sentiment, but I became possessed of a fascinating desire to learn the name and something of the history of every ex-soldier in this society. Then I said,

why not make these things matters of record? I remember when the last old soldier of the Revolution died and was buried with great honors. The survivors of the war of 1812, according to the report of the commissioner of pensions for the year ending June 30, 1893, numbered eighty-six, who were paid $10,494.27.

There are thousands of persons to-day hunting for definite information with reference to deceased soldiers and unable to arrive at the facts as they might have been given by those men for themselves. So I began my work of investigation along this line, determined to get brief records of those who are living from themselves, and of those dead from their near relatives. I presumed the list would not be a long one—comprising, perhaps, twelve or fifteen. But I had underestimated the number by about half, for instead of a mere dozen or so I have found twenty-eight, and I am not sure now that one or more have not been missed, either among the living or the dead.

Gentlemen, these friends of ours whom we have known perhaps only as brother dentists and instructors, were engaged in dangerous business this year thirty years ago. They were enduring hardships and trials of which we younger men know but little. They faced danger and death, capture and imprisonment, wounds and disease, with a courage and heroism which may have been equaled before but never surpassed. I am proud to devote a portion of this paper to short accounts of their service, and to ask you to place them upon record, as a part of the sacred heritage of this society. I only regret that I have been compelled to make them each so brief, for if the tales were fully told there would be enough to make more than one very interesting book.

I will consider their names in alphabetical order, and it so happens that the name which easily stands first among men of science in dentistry heads this list of our *soldier contingent:*

Green Vardiman Black, Jacksonville, Ill. It may not be generally known that before this society had an existence our honored member had begun his career of original investigation under the tutelage of Uncle Sam.

As a member of Company D, 129th Illinois Vols. he was ordered into the secret service and kept there till discharged in 1864. In charge of a few selected men it was his business to look for obscure signs, and trace out many lost and tangled threads. If a dangerous microbe, a regular pyogenic staphylococcus in form of

a *spy* was supposed to be within the lines, Uncle Sam had discovered that G. V. Black was just the one to trace him. He can tell you if he will, many an interesting tale.

This line of investigation was very expensive, personally, to Dr. Black, as the following letter indicates:

March 24, 1894.

DEAR DOCTOR NEWKIRK:

Your letter asking where I was and what I was doing thirty years ago, *May* of this year, was received. In answer, I will say, without hunting up the records, that I was ill, at my father's house, I think in May. I had been in a hospital in Louisville, Ky., for about six months and was brought home in April. In the latter part of May I began to walk about and in the latter part of the summer I began practice in Jacksonville, having in the meantime been discharged from the army.

Yours truly,

G. V. BLACK.

JOSEPH MORTON BLYTHE, Decatur, was 2d Lieut., Company A., 63d Indiana Vols. Elected February, 1862, age eighteen. Battle of second Bull Run commanded company. Later, sick and in hospital. Went through Atlanta campaign under fire. Commissioned 1st Lieut. May, 1864. Next with Schofield following Gen. Hood. In battles of Franklin and Nashville, Tenn. Later, Anderson, Wilmington and Tower Creek, N. C. Mustered out July, 1865. He had been Blythe to enlist, and was no doubt blithe to resume the study of dentistry.

SAMUEL ALEXANDER CAMPBELL, Mattoon, Ill. Member of 76th Penn. Zouaves 1861 to 1863. Discharged on account of disability. Reënlisted 1864, Company H., 151st Illinois Infantry, at Quincy, and served till February, 1866. Followed Sherman, and was with the force which captured Gen. Warford, with 12,000 men, at Kingston, Ga.; said to have been the last surrender of the war, June, 1865.

Dr. Campbell also paid dearly for his experience, marching three days and nights during an attack of the measles, which nearly cost him his life, and permanently injured his health.

Campbell is a good Scotch name, and belongs to fighting stock. Both of our Campbells were "coming" when the war broke out, but they came from opposite directions. The next gentleman of that name is

JOHN CAMPBELL, of Bloomington, who has the distinction of being our one and only ex-Confederate. He went into service in 1861, as 1st Lieut. of Company F, 22d West Virginia Reg., served

one year as Lieutenant, was then elected Captain of same company. Served as such until the disbanding of the army in 1865. Was in fifteen battles, and about seventeen skirmishes. On the 19th October, 1864, was twice wounded; through the left shoulder and through the left hip; was disabled for six months or more. Returned to command, and was sent home. February, 1866, came to Bloomington, arriving with seventy-five cents. Graduated later at Missouri Dental College. Joined this society in 1875. Has practiced dentistry in Bloomington, on same corner, in the same rooms, for twenty years. It is nearly eighteen years since he gave me all the assistance he could in my first study of dentistry and I shall never forget his kindness.

Elijah Brown David, Aledo, Mercer Co., Company A, 30th Illinois Inf., August 12, 1861 to October 27, 1864. Battles: Belmont, Ft. Henry, Donelson, Siege of Corinth, Port Gibson, Raymond (Miss.), Jackson (twice), Champion Hills, Siege of Vicksburg, Atlanta.

Made 2d Lieut. after Donelson, and later, Captain. Promoted for gallant service. Before Atlanta, July 22, the day Gen. McPherson was killed, went into action with 25 men; lost 6 killed, 5 wounded, 3 taken prisoners. Total 14. But he is with us yet, hale, hearty and wholesome.

M. S. Dean, one of our members, deceased 1881, a highly respected gentleman and scientist, translator of Magitot's work, *The Dental Follicle*, was quartermaster for a time of a Michigan regiment in Western service.

Daniel Bigelow Freeman, one of our Chicago friends, has in his office a fine collection of curious things, dental and miscellaneous, which every one of us ought to see. Among them are several bits of well-battered lead which were stopped in their swift career by his person, about thirty years ago down in Virginia. He was a member of Company G, 10th Vermont Inf., from August 4, 1862, till May 31, 1865. (1st. Brig. 3d Div. 6th a, c). He was in battles of Locust Grove, The Wilderness, Bermuda Hundred, Cold Harbor, Petersburg, and Rheam's Station, also in that of Monocacy, which probably saved the City of Washington from capture. He was on the skirmish line, and one of a few who escaped at the hands of the Confederate sharpshooters.

After working on a farm during boyhood, and practicing dentistry nearly thirty years, he declares that experience on the skir-

mish line the hardest day's work he ever did. He had some very narrow escapes in the field, and ten months' experience of hospital life.

Isaac Austin Freeman, Chicago, a cousin of D. B. Freeman, had a brief, but interesting experience, as member of Company D, 1st Vermont Cav. During his first year under Gen. Banks, in the Shenandoah Valley, while his regiment was making a rapid charge at Mt. Johnson to save a bridge, by the falling of his horse he received an injury which unfitted him for service, and compelled his discharge. His injury, however, did not prevent his capturing a prisoner, whom he compelled to help him into camp.

While we are with the letter F, we must not forget one of our Illinois boys who crossed over to St. Louis, but has met with us so regularly that we count him almost an active member.

Albert Homer Fuller enlisted as a private in Company E, 118th Ills. Inf. Vols., August 4, 1862, was afterward appointed Commissary, then Quartermaster Sergeant, later commissioned 2d Lieut. of Company E of the same regiment. He was with his regiment from start to finish, serving in the departments of the Mississippi and Gulf. Was at the first attack on Chickasaw Bluffs, and at the battles of Arkansas Post, Champion's Hill, Thompson's Hill, Black River Bridge, Vicksburg, 18th and 22d of May, Jackson, Grand Coteau, and other engagements. Was mustered out of the service at Spring Camp Butler, October 1, 1865. Was absent from the regiment and from duty but thirty days during the whole time.

Dr. Fuller had also two brothers, both dentists, in the service one of whom died from pulmonary trouble consequent on exposure, at siege of Fort Donelson; the other having been captured by Gen. Forrest, spent a year in Cahaba prison, Alabama, from which experience he has been an invalid ever since.

Most of you remember Dr. Hurtt, of Peoria, a faithful, active member for years, who removed to California for his health; now at Pomona, Cal., and a corresponding member.

John Milton Hurtt writes—"I made three enlistments, all at Columbus, Ohio, first, in summer of 1861, "Home Guards"; second, irregular, December 12, 1861, Company H, 46th Ohio; third, regular enlistment January 8, 1862, for three years, in 18th Regt. of Inf., U. S. A. (Regulars). I was assigned to Company A, 3d Bat. of that regiment; my rank was sergeant.

The sieges and battles were: Siege of Corinth, Miss. Battles

of Champion's Hill, Ky.; Stone River; Chickamauga; siege of Chattanooga, Tenn.; battles of Missionary Ridge; Hoover's Gap; Resaca, New Hope Church; Kenesaw Mountain; Peach Tree Creek; siege of Atlanta and battle of Jonesboro.

I served with the regular brigade, 1st division, 14th army corps, from the time I arrived at Nashville, next day after the fall of Fort Donelson, February 16, 1862, until discharged from Lookout Mountain, Tenn., January 8, 1865."

Dr. Hurtt's writing is wonderfully exact and neat. He once devised and made out a set of company records—the books twice took the premium over all competition, in the Army of the Cumberland.

As a specimen of his poetic descriptiveness I submit the following.

"The transcendent scenes of hundreds of camp fires lying at my feet, a sea of candles consumed in one evening at Graysville, Ga.: The cannonading of Kenesaw Mt., the battle of Hooker above the clouds (fog) at Lookout Mt., the movements of the two armies seen from Kenesaw, glistening arms, moving wagons, artillery and cavalry, flashing all colors in a brilliant morning sun, are some of the pleasing memories set over against the mud, rain, cold, heat, dust and the horrible carnage of war."

I am sorry to say that Dr. Hurtt's health is now so poor that he is unable to practice. A kind word from some of you would be gratefully received at this time. Write to him.

Homer Judd. All the older and many of the younger members treasure the memory of the learned, genial and honest Dr. Judd. We knew him as an authority in scientific matters, as a member of the State Board, and stalwart defender of dentistry against all foes and detractors. We knew him as friend and we mourned his taking off, but how many of us know that Dr. Judd at the commencement of the war served as acting assistant Surgeon United States Army, on the hospital steamers and in the hospitals in the West. After the battle of Shiloh he was one of four surgeons charged with the care of five hundred wounded soldiers on board a hospital steamer. His health becoming impaired he was compelled to visit Minnesota for rest and recreation. Subsequently he was appointed surgeon of the 40th Regiment Mo. Vol. and served with them at the battles of Franklin, Nashville and Spanish Fort. He remained in the service for some time after the war, be-

ing stationed at Huntsville, Ala. He was mustered out of service in the latter part of 1865, returned to St. Louis and entered upon the practice of dentistry. (A portrait of Dr. Judd may be found as frontispiece, Ill. Trans., 1891.)

Charles Ambrose Kitchen. The next in order is one who, like Wellington, "Stands four square to all the winds that blow," a modest gentleman with the modest, wholesome name of Kitchen.

Where was he and what was he doing a little more than thirty years ago? Chance if he ever told you anything about it. He was making "music for the boys" as a member of the Band, 33d Ill. Vol. Infy., a regiment raised at Normal and Bloomington, composed mostly of teachers and students and dubbed "The Brain Regiment." (Col. Hovey.)

Our friend Kitchen tramped with his command twice across Missouri and once through Arkansas, and was in at the severe battles of Fredrickton and Cotton Plant, Ark. A part of this time he was a meagerly supplied Kitchen, living on less than half rations. He was mustered out of the army in time to be mustered into the State Society at its organization, and he has not missed a meeting for twenty-eight years.

The next upon the list is the name of one possessed of such versatile ability that he might have achieved distinguished success, either as a journalist, lawyer, surgeon, soldier or man of business, as he has in our profession. Before his name is announced you all know that I refer to

Col. Charles Rudolph Edward Koch, who enlisted August, 1862, as private in Company G, 72d Illinois Vol. Inf. (Chicago 1st Board of Trade Regiment). August, 1863, became 1st Sergeant in the 58th U. S. C. I. November 5, 1863, Captain 49th U. S. C. I. Participated in affairs of Clarkston, Mo., and Osceola, Ark.; Grant's Northern Mississippi campaign; Lake Providence and Yazoo Pass expeditions; Vicksburg campaign including Champion Hill and assaults of May 19 and 22. Assisted in paroling prisoners. Participated in expedition to and capture of Natchez. Was here detached to serve as chief clerk at headquarters of the district under Gens. Ransom and Gresham. Then as aid to Adjt. Gen. Lorenzo Thomas, who was engaged largely in reconstruction work, and especially in protecting the interests of the freedmen. Rejoined command early in 1864 and participated in minor campaigns for protecting Uncle Sam's interests along the

Mississippi Valley. May, 1865, assisted in capture of Yazoo City, of which he was made Provost Marshal. August, was ordered to Vicksburg to assume charge of Provost Marshal Dept. Western District of the Mississippi. Held this position under, and to the satisfaction of three commanders, Gens. Maltby, Force and Osterhaus, till mustered out of service March 23, 1866. Considering the unlimited functions and authority of his office, and the trying days of reconstruction, which required the exercise of the greatest circumspection and good judgment, his success in this difficult position reflected great honor upon himself, for we must remember he was not yet twenty-two years old. In April, 1866, he returned to Chicago and at once resumed the study and practice of his chosen profession—dentistry.

During the railroad riots of 1877 he became captain of a company of war veterans, who defended the southwest portion of the city for over a week against a turbulent mass of rioters. Organized Co. "I" 1st Infantry Ill. Nat. Guard immediately after, and was commissioned Captain of same August 19, 1877. Became Major of the regiment April 24, 1886; Lieut. Colonel, February 13, 1888, and Colonel, April 30, 1889. Resigned his commission November 1, 1893.

Reuben Neal Laurance. The initial "L" was represented by a man of clear grit, as those who have associated with him most know the best. I will let his story be told by his letter to me, which is a model of much in little:

Lincoln, Ill., March 28, 1894.

Dear Dr. Newkirk: Yours received. Pardon delay. I had to look up old "muster roll" to get information. Originally entered service as private Company F, 38th Ill. Vol. Inf., at Atlanta, Ill., August 16, *1861. Promotions:* Corporal, Sergeant Major, 1st Lieut. Company F, and R. Q. M. 38th Reg. In actions: Siege of Corinth, May, 1862; Champion's Hill, Ky., October, 1862; Knob Gap, Tenn., December, 1862; severely *wounded* in face at Stone River, December, 1862; Liberty Gap, Tenn., June, 1863; wounded in thigh at Chickamauga, Ga., September, 1863; in Atlanta campaign, 1864; Franklin, Tenn., November, 1864; Nashville, December, 1864. *Mustered out March 20, 1866, service four years and eight months.* I belonged to Sherman's army. It was mustered out in 1865. But I was kept in until 1866, on *staff duty in New Orleans and Texas with my command.* Yours truly,

R. N. Laurance.

The story is briefly told, but there are volumes between the lines.

Not to be outdone by the Ks, our friend,

Iverson Allen Lumpkin, of Mattoon, comes forward to make two of the Ls. He was a volunteer under Caleb Jackson, Missouri State troops, served only four months, but saw enough of war to satisfy his curiosity in the battles of Boonville, Carthage and Wilson's Creek.

J. Frank Mariner. As we might expect to find, the letter M was well represented. It stands for military, Mariner, Matteson, and Matthews. J. Frank, "our Mariner," took a horse for his ship and sailed through the South land as a member of Co. L, 15th Ill. Cavalry. Enlisting as a private, he came home a Major. He was at Ft. Henry, Donelson, Pittsburg Landing, Siege of Corinth, Farmington and Siege of Vicksburg; afterward a 1st. Lieut. in command of company, acted as escort successively for Gens. Grant, Halleck and Dodge. This Mariner of ours, so modest, and almost timid of speech in the meetings of this society, can tell you if he will of dangerous exploits and dashing charges, that will quicken your pulse and stir your blood. Next comes

Charles Franklin Matteson, who enlisted at Galesburg, Company E, 117th Ill., April 19, 1861. Transferred October 2, 1862, to Company G, 103d Ill., 1st Lieut., soon afterward Captain, in Army of the Tennessee. Was in thirty-two battles, among them Donelson, Shiloh, Corinth, Vicksburg, Jackson, Lookout Mountain, Atlanta campaign and March to the Sea. Company E was color company at Shiloh; with thirty-two men, lost nineteen. 1864, at Savannah, C. F. Matteson was detailed as Asst. Quartermaster 15th A. C. in charge of 1,000 to 5,000 men, handling all stores for the corps, serving here until March, 1865; Morehead City till May 9. Rejoined command at Washington. Mustered out at Louisville, June 21, and *paid off at Chicago*, July 9.

A. E Matteson, younger brother of C. F., enlisted as a member of the band, 26th Ill. Inf. Saw service at New Madrid, Siege of Corinth, Island No. Ten, and Farmington. Acted as volunteer aid to Gen. Thomas at battle of Nashville.

Rodolph Matthews now of Wichita, Kansas, formerly a member of this society, resident of Pontiac, where for nine years he was associated with Dr. Townsend, is also an ex-soldier of Illinois.

Enlisted at Oquawka, Ill., July 28, 1862, Company G, 84th Vol. Infty. Discharged June 8, 1865, at Nashville, Tenn., (3d Brig., 1st Div., 4th A. C.) Was detailed as Company clerk and adjutant's clerk, and was with his regiment in all its marches and battles, ex-

cept for a short time when he was in hospital at Louisville. The regiment was in battles of Chickamauga, Lookout Mountain, Missionary Ridge, Ringgold, Resaca, Atlanta, Jonesboro, Nashville, and Franklin.

It grieves me to state that neither "N" nor "O" has a representative in the list, but we are in a measure consoled by the record of our *Quaker friend from Whitehall,*

Thomas Western Prichett. He says in answer to my queries:

"Student of Uncle Sam—1862, class '91 Sec. G, (91st Reg. Ill. Inf., Company G). Three years' course. Graduated July 12, 1865. High private, (6 ft.) *Brevet corporal.* Pension *not* applied for. May 8, 1864, was at Brownsville, Texas. Ever yours,

T. W. Prichett."

I happen to know that between these quaint lines you may read if you will the record of a most arduous service by one of the most faithful of men. Besides purely military service, he endured at Brownsville and on Brazos Island, Texas, climatic and dietetic hardships which nearly cost him his life.

I have but recently been informed that our member from Belleville, a man justly celebrated for original research and scientific attainments,

John Joseph Ravenscroft Patrick, in addition to his many other honors bears those of the military. He served with Co. G, 130th Reg. Ills. Vols., from the mustering in thereof October 25, 1862, till January, 1864. From January 23, 1863, to February 10, 1864, he was captain of his company, and participated in the Vicksburg campaign, and from Milliken's Bend, through battles of Port Gibson, Champion's Hill, Black River Bridge, and charges of May 22 and 23. After surrender of Vicksburg, regiment assisted in ten days' siege at Jackson, Miss., resulting in capture. Returned to Vicksburg, was transferred to army of the Gulf, under Gen. Banks ; went via New Orleans to Texas, where Capt. Patrick resigned because of poor and failing health. His resignation at this time was fortunate, for he just escaped the ill-fated Red River expedition, wherein almost the entire number of the regiment were taken prisoners and kept at Tyler, Texas, thirteen months, suffering great privations.

Mark H. Patten who was a member of this society many years, also belonged to the military list, having served from July,

1862, till the close of the War—first 100 days in Company F, 71st Ill. Inf., afterward in Co. C, 10th Ill. Cav. A part of the time he was in the United States army mail service, delivering to the boys their anxiously looked for "letters from home."

With "R" we meet a royal man from Carthage—one with a plural name and a heart big enough for two.

E. M. Robbins, Private in Company H, 78th Ills. Vol. Inf., enlisted July 1862; was always in the front, participating in the battles of Chickamauga, Mission Ridge, Sweet Water, and all the principal battles of the Atlanta campaign. Went with Sherman to the Sea, thence from Savannah to Goldsborough and Rolla, where Johnson surrendered, thence onward through Richmond to Washington, where he was one in the grand review and mustered out—all for $13 a month, in depreciated currency, the last of which was received in Chicago in June, 1865. There'll be a pension in heaven for all such men.

The initial "S" has four representative on our list. In 1863, there was living in Pennsylvania, a boy named

George D. Sitherwood. He enlisted first for ninety days in an independent regiment of cavalry—State guards—and served as bugler. Enlisted later in Signal Corps, U. S. A., at Indiana, Pa., for five years. Sent to Signal Camp of Instruction at Georgetown. Again served as bugler. Was on the skirmish line at Fort Stevens, when capture of Washington was threatened by Gen. Early. February, 1865, transferred to Hilton Head, and later to Fort Pulaski, near Savannah, Ga. Station flagged the news of the capture of Jefferson Davis, telegraph lines being cut. Honorably discharged August 12, 1865.

"S" is a musical letter, and while our friend Sitherwood was rousing the echoes of the Pennsylvania and Virginia hills with his bugle,

Gilman T. Smith was inspiring the boys of the 47th Ill. Vol. Inf. with the stirring notes of a 1st B cornet. Remained one year in service, till all regimental bands were mustered out. Is now commandant of Ferris Post 309, G. A. R.

Ezra Hazen Stewart, Joliet, has written me this brief account of his service:

Joliet, Ill., March 27, 1894.

Dr. Garrett Newkirk, Chicago, Ill.

Dear Sir:—In reply to yours of the 23d inst. would say that I do not think that my experience in the army was different from most people, unless I was more frightened in the first action than generally falls to the lot of man. I enlisted in

Company H, 4th Vermont Inf., September 2, 1861; served under McClellan through the "Peninsula Campaign," and participated in most of the actions, more particularly Lee's Mills, Williamsburg, Savage Station, etc. Am happy to state that I returned with my bones in fair condition. Yours truly,

E. H. Stewart.

Dr. Stewart was evidently a young man of courage, for he has the courage now to tell the truth about his first battle. He probably tried to conceal his feelings, and every other man in the regiment did the same.

The next to mention is a veteran of war, and a veteran tried and true of this society. If we were asked to describe his character in a single word, it would be *faithfulness;* for he has never been known to swerve from the line of duty or fail in the performance of whatever he had undertaken. You all know that I refer to

Col. Edgar Denman Swain. In June, 1861, he organized at Batavia, Ill., Company I, 42d Regt. Ill. Vol. Inf., mustered in July 22, and chosen Captain. September 21, marched to Benton Barracks, St. Louis. October 18 to December 13 took part in Fremont's campaign to Springfield, Mo. Winter quarters at Smithton, Mo. February 3, left under orders for Fort Donelson. Marched to Cairo, thence to Columbus, Ky., March 4, Island Number Ten; March 15, on its surrender was detailed with company to take captured officers to Cairo, on captured steamer, "Admiral." Took part in Mississippi River campaign to Ft. Pillow. Joined Gen. Pope, engaged in Siege of Corinth and battle of Farmington. Joined Buell at Nashville. Entered on Murfreesboro campaign December 26, including battle of Stone River. Took part in campaign under Rosecrans, which ended in being besieged at Chattanooga. Siege broken by battles of Lookout Mountain and Mission Ridge, with expedition to relieve Burnside, at Knoxville. January 1, 1864, Company re-enlisted as veterans. After furlough joined Sherman's army for campaign to Atlanta. Part of force under Gen. Thomas against Hood. After Hood's defeat, followed his broken army to Tennessee River. Returned to Nashville. From there went, via Tennessee and Mississippi Rivers and New Orleans, to Port Lanasa, Texas, arriving July 23. Camped upon Placida Creek, same camping ground used by Col. Jefferson Davis, with his Mississippi regiment en route to Mexico, in 1846. July 15, 1865, was ordered by Gen. D. S. Stanley to assume command of 3d

brigade, 2d Div., 4th A. C. Retained this command till his own regiment received orders to be mustered out. Asked to be relieved of brigade command to accompany regiment home. Mustered out at Springfield, Ill., having served four years, seven months; retiring as full Colonel of his regiment by commission. Breveted Colonel of U. S. Vols. by U. S. Senate, March 13, 1866, for meritorious service.

Joined 1st Regiment Ill. National Guards March, 1877; served as Major and Lieut. Col. through the period of railroad riots same year. Commissioned Colonel and left the service of the State five years later.

Col. Swain was wounded in the knee by a bullet during the Atlanta campaign, but kept at the head of his command, the "boys" lifting him to and from his horse.

Samuel Coleman Wilson was an honored member of this society, living at Bloomington; died June 27, 1881. I have been able to learn only the following particulars of his earlier life. He was 1st Lieut. of Company F, 168th New York Vol. Inf., was in second battle of Bull Run, 1863. Suffered sunstroke while in service, from the effects of which he never recovered, his death having been, as it was believed by physicians, traceable to this cause.

In tracing out the records and history of the various members of our military contingent, I have found it true, that scarcely a man went through the service without some sort of injury aside from wounds, as the result of hardship and exposure. It is not surprising that this should be so, when we consider all that is involved in a soldier's life.

Our list closes with the name of

Walter Benjamin Woodward, formerly of Peoria, now of San Diego, Cal., formerly an active, now a corresponding member of this society. At the age of eighteen he enlisted from Jacksonville, Ill., college, in Company C, 145th Ill. Vols., a company raised by Prof. Crampton, of the college. This was near the close of the war, May 19, 1864. The enlistment was for one hundred days, and the regiment was discharged in a little more than four months—September 23, '64, after having done garrison duty at Rolla, Mo., and Alton, Ill.

The United States has reason I think to be proud of the conduct generally of her citizen soldiers north and south at the close of the war.

Never in the history of the world had there been such a sudden and general disarmament in any country, and the quiet return of so many men from the highways of war to the pleasant paths of peace.

Our "boys" returned at once to their dental offices and soon enlisted in the ranks of this and other societies. In fact some of them were at the very start, in Illinois, and have never wavered in the line of march to this day.

Thirty years ago there was one dental society in the State of Illinois. The Chicago Society was organized February, 1864. Fifteen years ago there were but two—this and the Chicago. To-day there are eleven, viz.:

The Illinois State Dental Society.
The Northern Illinois Dental Society.
The Southern Illinois Dental Society.
The Central and Western Illinois Dental Society.
The Eastern Illinois Dental Society.
The Chicago Dental Society.
The Chicago Dental Club.
The Odontological Society of Chicago.
The Odontographic Society of Chicago.
The Hayden Dental Society of Chicago.
The Atkinsonian Society of Chicago.

Besides these there is the Tri-City Society, partly of Illinois, a union society of Rock Island, Moline and Davenport, and the Quincy Dental Society.

The Illinois State Society has had a career of uninterrupted prosperity and usefulness.* The relation of its members has been almost uniformly that of friendship, mutual confidence and respect. With a military step, it has marched steadily forward and never suffered defeat, save once or twice, in a skirmish with the State Legislature.

But we are going to move on that host again with the swords of argument and petition, and it is but a question of time when we shall conquer for the State of Illinois an efficient dental law.

The membership of this society has ever had, I think, a good deal of the soldier spirit within its ranks. The true soldier is brave ; he has the courage of his convictions. He is honest, be-

*For a history of the society for twenty-four years, see paper by Dr. Koch, Trans. 1889.

lieving in the right of his cause. He is loyal, steadfast, and unwavering. He performs faithfully whatever duty is placed upon him. He is self-sacrificing, not expecting to be paid in one way or another for everything he does. Above all, he is *patient*. If matters are not going as he thinks they should he does not stir up strife, but waits until they can be regularly righted. He never *deserts* nor refuses to act because something has been done of which he personally disapproves. As a subordinate he is obedient to rules and orders. As an officer he is not overbearing, but enforces the law.

What is the spirit which has made England such a power in the world? Largely this: That every English boy is trained to believe that he has the proudest heritage on earth in that he was born an Englishman. With him it is England first, all the time and forever. Where England's power, or interest, or honor is involved, there he stands in his place, immovable as Gibraltar or the squares of Waterloo. If the order is "Forward," he goes even "Into the jaws of death," as at Balaklava, when "some one had blundered."

Something like this enthusiastic loyalty is necessary for us. I would that I might to-day command the attention of every honest and respectable dentist in the State of Illinois, especially the young men; I would say to each one, "If you are not already a member of the State Society *enlist at once*, and enlist not for a year or two years, but for *life*. Come into our battalion, and come *to stay*."

Our interests are all bound up together in this great commonwealth. If we were united, earnest, enthusiastic, determined, as we should be, from Chicago to Alton, and from Galena to Cairo, where would be the legislature that would refuse to accede to our reasonable demands for a more efficient law?

I believe it to be the duty of every dentist who wishes to occupy an honorable place in his profession, or as a citizen in the community where he lives, to be a faithful life member of at least two societies. First, the State Society, where he can stand shoulder to shoulder with the profession as a whole within the State. Second, his nearest local society, wherein he may have an intimate fellowship with his immediate neighbors. And now I close with this appeal to the local societies of the State, north, south, east, west, and every one in Chicago:

Stimulate and encourage your young men to become members of the State organization. Let that be the grand rallying point of the year.

A strong State society is essential to the strength and unity of our profession in Illinois. There must be a general meeting place for men of all sections of the State, else how can they sustain their acquaintance and act in harmony?

Let it be our ambition to make this society stand in the future as it has in the past, for all that is sound and progressive in dentistry. Let us ever cultivate the spirit of friendship, and make the social features alone so hearty and wholesome that none can afford to miss them.

The great International Dental Congress has been, and is now a thing of the past. Probably we shall not, in a lifetime, see its like again. Its chief value consisted, I think, in bringing together men from all parts of the globe, and establishing a world-wide relation of fraternity.

But our State Society is ever with us, and her blessings are perennial. May she never lack for soldiers, loyal and enthusiastic, and may her flag forever float as the yearly rallying point for dentistry in Illinois.

ETIOLOGY OF DENTAL CARIES.

By A. H. Peck, M. D., D. D. S., Chicago.

Etiology, "That branch of medical science which treats of the causes of disease." Hence, we are to consider the causes of the disease known as "dental caries," which latter means a chemical disintegration or wasting away of the constituent elements of the tooth substance, molecule by molecule.

In a study of diseases in general we find the causes divided usually into two classes, viz.: predisposing and exciting. The same classification we shall apply to the special disease under present consideration. By a predisposing cause is meant any unnatural or pathological condition of the patient or the part rendering it more liable to attack, but which condition is not in itself sufficient to, or capable of causing an actual inception of the disease. By an exciting cause is meant the presence of that condition, that necessary element, or that indispensable something which is in itself directly responsible for the actual beginning of the disease.

Before entering into a consideration of the real causes of dental caries, both predisposing and exciting, I trust you will not consider it out of place, but rather will find it to be interesting, if we spend a few minutes in referring to the ideas of the earliest investigators and writers upon this subject. And this I consider of interest, not only as setting forth the actual ideas of these men, but to me it is a pleasure in studying this subject to especially note the progress or growth of thought of each succeeding investigator, how step by step they gradually came a little nearer the truth, until at the present time we find ourselves almost exclusively indebted to the efforts of two men for what we actually know in connection with the true etiology of dental caries, Drs. Miller and Black. Says Dr. Black, this subject has been treated by very ancient writers, "but the works of Boudett and Jourdain, which appeared between the interval from 1754 to 1766, seem to have been the foundation of the scientific investigations that were undertaken in after years, and marked an era of awakening

thought and of experimental study." The writings before this time, "seem to have been based more upon mere casual observation than upon any definite line of scientific investigation." The prevailing opinion at that time was that caries resulted from inflammation, and their "constant endeavor was to account for it upon that hypothesis." John Hunter whose writings bear evidence of a thorough investigator and careful writer, while considering caries a result of inflammation, similar to necrosis of the bones and mortification of the soft parts, expresses himself as dissatisfied with this theory but proves himself disappointing in that he presents nothing new on the subject.

At the beginning of the nineteenth century, the investigators still held to the theory of inflammation, but made a marked advance over their predecessors in that they began to particularize. A Mr. Fox, in 1806, advanced the theory that the inflammatory process had its origin within the substance of the lining membrane of the pulp chamber, the membrana eboris, which in severe cases would deprive the dentine of its nourishment, resulting in its decomposition and the consequent formation of the carious cavity.

In 1829, a Mr. Bell differs from the preceding theory in that he regards the inflammatory process as having its origin in the circumference of the dentine just underneath the enamel. And that the area of dentine tissue thus involved dies, and remaining there becomes an irritant to the surrounding tissue, which latter becoming involved in the inflammatory process also dies, thus in this progressive manner the destructive process continues, finally resulting in the wasting away of the entire crown of the tooth. A Mr. Köcker goes a step further than his predecessors in his endeavor to explain the phenomena of this disease. While admitting that the tooth structure is deprived of its nourishment through the process of inflammation, he adds that the part thus diseased is finally disintegrated through the medium of some chemical agent.

About 1830 this hitherto popular theory was discredited by very many, and with little difficulty was shown to be incorrect. One of the most effective arguments against it was the fact that human teeth, having been extracted, prepared and mounted as substitutes, also artificial teeth carved from ivory, bone, etc., were alike subject to the ravages of decay, and that, too, in a manner precisely the same as the natural organs. Hence the impossibility of decay resulting from any of the vital processes connected with

the tooth itself. And in the language of Dr. Black, "the cause of decay must be regarded as extraneous to the teeth and acting upon them from without."

Robertson, of England, in 1835, taught in a published work, that caries was the result of a chemical disintegration of the tooth substance through the medium of an acid, generated from the decomposition of particles of food which found a resting place at various points about the teeth, and denied, absolutely, that inflammation played any part in the formation of the carious cavities.

Dr. George Watt whose memory is still fresh in the minds of many of you, was the author of what is commonly known as the "mineral acid theory." He contending that decay was caused chiefly by the acids, sulphuric, hydrochloric, and nitric. Sulphuric acid being responsible for the production of the black decays—nitric, the white—and hydrochloric, the intermediate colors.

There are a number of other theories advanced by different ones, of which we might speak with profit, such as the very ingenious one of Bridgeman in his essay, in which he says in substance, caries is the result of peculiar electrical conditions, the crown of the tooth forming the positive electrode, and the tissues serving to retain the tooth in its socket, the negative. These conditions being intensified through abnormal qualities of the fluids of the mouth, the lime salts in the crown of the tooth are liberated, the acids with which they were combined being set free, thus resulting in a molecular disintegration of the substance of the dentine forming carious cavities. But fearing I have already given too much time to this part of the subject, will pass at once to what is generally accepted at the present time, and undoubtedly is the correct theory of dental caries.

First, the predisposing causes. Faulty formation of the teeth. We shall consider this not only as regards the malformations of the teeth, but also with reference to the character of the constituent elements of the tooth itself. The variations in form from the normal which most favor the inception of decay, occur as pits and grooves, especially on the occlusal surfaces of bicuspids and molars, the buccal surfaces of molars, and the lingual surfaces of the upper anterior teeth.

These defects afford lodgment for particles of food, until the acid which actually dissolves the lime salts from the tooth structure is evolved through the process of fermentation. The fungi

once implanted in these depressions, and the corrosive action once begun, the waste of tissue progresses little by little, until finally entrance to the dentine is accomplished.

If in the constituent elements of the tooth, the organic matter is in excess over that of the normal, it must necessarily follow that the substance of the tooth generally is softer than it otherwise would be. In consequence of well-known physical laws, the corrosive agent will attack the substance of such a tooth much more readily, and the destructive process will be carried on at a much more rapid pace than in connection with a tooth of normal density —hence the inducement held out to the acid to inaugurate its work of devastation, and the means afforded for its rapid progress through the faulty make-up of the substance of the tooth itself.

The manner in which the teeth are proximated has much to do in predisposing them to caries, and especially if the proximating surfaces are broad and flat, and also if they do not at any point touch each other, other things being equal, favor the lodgment of the food and fungi until fermentation shall have produced the substance necessary for the beginning of caries. Again, in the proximal spaces when the gum festoons have been partially or completely destroyed, thus affording abundant space for the lodgment, retention and evolution of those necessary elements to the inception of decay, also any malposition of the teeth in the arch of a nature to favor such lodgments, predispose them to decay.

Hereditary influences are exceedingly important as predisposing the teeth to caries and must not be overlooked. That peculiarities, varying from the normal, in the formation of the teeth are directly transmissible from the parent to the child is generally accepted as correct by the best authorities, and especially malformations in the form of the teeth which we have already observed to be very important factors in predisposing them to decay.

Morbid and unnatural conditions of the saliva and other fluids of the mouth, and especially when acid in reaction, as they are frequently found to be, and in many cases to a considerable degree, must be regarded as affording favorable environments for the development and propagation of those elements necessary to the inception and progress of the carious process. And this brings us up to the consideration of the exciting or the actual cause of decay of the teeth. And the substance which produces this diseased

condition of the teeth is *lactic acid*, as *per* the results of the experimentations of Dr. Miller.

(Certain numbers of *Independent Practitioner* of '84 and '85.)

To account for the presence of lactic acid in the mouth would involve a consideration of the fermentative process, and also of the essential physiological processes of all organized life—the former indeed comprising the latter—to-wit: (1) "The production or formation of a solvent which," says Dr. Black, "is usually an unorganized ferment, peptonizing agent or diastase, for the performance of the act of digestion, or the preparation of food material for absorption and assimilation. (2) Assimilation and nutrition, or the act of tissue building. (3) The formation of waste products, the act of denutrition, or the shedding out of material that has once been formed into protoplasm, or used in connection with the process of tissue building, and (4) the capability of reproduction in a definite line of forms." And by way of illustrating the physiological process of fermentation, what prettier example can we cite than that from the pen of the author last quoted, of the sprouting grain of corn, which, says he, "is composed of three natural divisions—the germ, the perigerm, and the starch envelope. The germ is the embryo plant; the perigerm (the scutelum of botanists) is the organ of digestion destined to serve the needs of the germ during its embryonic development; the starch envelope is the store of food to serve the young plant until such time as it shall have developed the organs with which it will be enabled to gather its own food. Under the influence of warmth and moisture, the germ is quickened into activity, and at the same time the perigerm elaborates a substance which is known as a soluble or unorganized ferment, the office of which is the digestion of the store of starch with which it is surrounded. This soluble ferment comes in contact with the starch granules, and converts this substance into glucose and levulose. This is exactly similar, physiologically, to the formation of the peptones by the gastric juice of the animal, and is the digestion which fits the food, the starch, for the needs of the developing germ of corn. An examination of the soil in which this corn is grown, will reveal the fact that it has received acetic acid, this being one of the products of this physiological process, the other being the carbon dioxide given off in the air." This, if you please, constituting the type of the process of fermentation.

This leads us up to the statement that it is impossible for true caries, as we find it in the teeth of the human mouth, to have a beginning until these physiological processes of fermentation have been gone through with. And in connection with caries the elements essential to this process are *sugar* and certain *microörganisms* habitually developed in the mouth. Much of the sugar assimilated by the bacteria is taken directly into the mouth, but probably the larger quantity, however, is changed into such by the action of the ptyalin of the saliva upon the starchy substances. However, the bacteria seem to possess the power, in the absence of the ptyalin, by virtue of a substance it gives off, to transform starch into its appropriate food. And precisely in the same way as we observe the process of nutrition to be carried on in the human system, and, as in connection with all organized life everywhere, do we find it to be in connection with these bacteria. Food taken into the mouth, masticated saturated with saliva, passed into the stomach, there acted upon by the gastric and intestinal juices—in short prepared for assimilation by the system.

The nutritive portions, or those parts of the various kinds of food which can be utilized in building up the constituent parts of the body, are passed through their respective channels into the blood. The waste, or those parts which cannot be utilized, are cast off mainly as urea and uric acid. So, in connection with the bacteria of decay, their particular food, *sugar*, is taken in by them, and the nutritive portions immediately turned to the uses of their bodies, so to speak, that they may have a future existence, prosper, and be multiplied—that portion which they cannot so use being cast off in the form of *lactic acid*. And this is the substance that is responsible, directly, for the terrible destruction of the human teeth by this carious process. This it is that actually attacks the constituent elements of the tooth and molecule by molecule dissolves them away.

It is needless to say that the origin of all decays of the teeth is at the outer surface of that part of the tooth where the cavity is found. This lactic acid having been formed as described above, and under favorable circumstances, attacks the basis substance, the salts of calcium, of the enamel.

The manner in which the carious process effects an opening through the enamel tissue is essentially as follows: *First*, the enamel prisms are held together by a substance commonly spoken

of as the interprismatic-cement-substance. This constituent part of the enamel, in its general texture, is considerably softer, or at least more soluble than is the substance constituting the enamel prism itself. Hence, it most naturally follows that the acid will attack this substance and dissolve it away more readily than it does the substance of the prism. And I feel safe in saying that observations generally regarding the clinical history of caries of the enamel substantiate these statements. The cementing substance is dissolved away little by little, molecule by molecule, and in this way the corrosive action of the acid slowly but surely progresses until the entire thickness of the enamel has been traversed by it. Thus the substance which binds the enamel prisms in such close proximity, the one to the other, being destroyed, leaves the latter free to separate and fall apart. However, the prisms themselves do not by any means entirely escape the corrosive effects of the acid.

It will almost invariably be observed, upon examination with the microscope, that their ends have been rounded—some but slightly, others to a greater extent. And not infrequently it will be observed that their substance has been wasted by the process throughout their entire length, in some cases very considerably, in others but slightly. But rarely ever is it the case that they are entirely destroyed during the penetration of the tissue.

These openings through the enamel are oftentimes exceedingly small, indeed so minute are they as scarcely to be discernible by the naked eye. Upon reaching the surface of the dentine, because of the lateral ramifications of the branching endings of the dentinal tubules, and also because of the existence of numerous minute interglobular spaces just between the dentine and enamel tissues, the carious process is induced to spread laterally to some extent, before it will penetrated far into the substance of the dentine. As the process progresses within the dentine, and the spread in the lateral direction under the enamel becomes greater it must necessarily follow that the enamel tissue will be attacked on its inner surface. Thus from this point on the carious process becomes in a sense a two-fold one, prosecuting its deleterious work inwardly toward the pulp chamber of the tooth, and outwardly toward its circumference. In this way the enamel for a considerable distance in all directions from the original opening will have become so weakened as to be unable to further withstand

the pressure brought to bear upon it by the force of mastication or otherwise and breaks down. Thus is the external opening into the carious cavity suddenly and materially enlarged, leaving the margins more or less rough and uneven.

In the dentine, the destructive process is observed to be carried on substantially as follows: As has been stated above, and for the same reasons, the acid upon reaching the surface of the dentine extends in a lateral direction to some extent before penetrating to any considerable depth in the substance of the tissue. If the structure of the tooth is normal, this lateral extension at first will not be so great as in teeth whose composition does not contain the usual amount of inorganic matter. And more especially in those teeth where the union of the dentine with enamel is imperfect, and more extensive interglobular spaces exist so that the immediate and more rapid lateral spread of the acid is thus facilitated. Usually the field of tissue invaded by the carious process is in form not unlike that of a cone with its "apex pointing toward the pulp, and its base at the inner surface of the enamel." And especially is this form the rule in teeth of normal structure. Otherwise a great deviation from this form will be observed.

The carious process will spread over a much greater area of tissue before penetrating deeply, thus resulting in the formation of a cavity more or less broad and flat.

The fungi insinuate themselves at once into these natural openings—the interglobular spaces—and also virtually grow into the center of the tubules; the acid is constantly being produced, and penetrates the tissue to a considerable extent in advance of the penetration of the fungi. Indeed the substance of the tubules becomes completely saturated, and the acid passes beyond their limits into the intertubular cement substance, which latter being softer or more soluble than the matrix substance of the tubule itself, is completely dissolved away, thus affording opportunity for the resultance of one of the chief characteristics of true caries of the dentine, namely, the swollen or enlarged condition in which the tubules are so often found to be. In the course of time the walls of the tubules themselves will have been destroyed, thus resulting in the coalescence of two or even more of the tubules into one.

Thus in this progressive manner is the substance of the den-

tine destroyed by the carious process. It must be kept constantly in mind that in no instance, except, possibly, the two cases cited above, do the fungi of decay penetrate in advance of the corrosive effect of the acid. The latter goes before, destroys the tissue, effects an opening, and the former follow after insinuating themselves into the openings thus formed. In this way a constant production of all the necessary elements to the furtherance of the carious process is kept up.

DISCUSSION.

Dr. G. V. Black: I had the opportunity of looking over Dr. Peck's paper at noon to-day, and I had some difficulty in determining what course I should pursue in opening the discussion on it. It seems to me, if there is anything that should interest a society of dentists it would be this subject of dental caries, a disease which most of us spend the greater part of our time in treating.

We have had this evening a careful, concise *résumé* of both the growth of thought upon this subject and of the theories that are now generally accepted as true as to the causation of decay of the teeth. Now, it would be impracticable for me to go over this portion of our ideas of caries before you this evening. It has been done by Dr. Peck. But there are questions that are still arising that require further discussion and elucidation. We may say now that we understand the exciting cause of caries. We know how it operates upon each individual tissue. We know the nature of the cause, and yet there are questions beyond that that are not understood, so that when we pass on beyond this we begin to find ourselves in the border lands that are still covered with brush, where we are unable to see ahead. One question arises prominently. It is this: What good comes of this knowledge that we have obtained of caries? We may say the same thing in regard to tuberculosis. We have come to know the cause of tuberculosis, and the mode of operation of that cause, and still we may say what good is it? Well, in that case perhaps there is not much improvement in the way of treatment of the disease that has become established, but from the steps that are now being taken of practical isolation of tuberculous patients we may expect great good in the future. And in answer to the question, what good comes from the tracing of the causes, the mode of operation, etc., of dental caries, we may now say that we are pursuing to-day more practical plans of treat-

ment—not that we have changed them very materially, but we are continually changing them from month to month and year to year to make them agree more perfectly with our knowledge of the causes of decay, and step by step we are more successful in the treatment of the disease, more successful within the last ten years than we were in the previous ten years, and so we may expect to be more successful in the next ten years than we were in the last ten years. We have good reason to expect it. There is a curious feature connected with this subject—a feature I think that is connected with many other subjects in the advancement of thought. The words we use in talking of caries of the teeth have been handed down to us from generation to generation, and these words in themselves are propagating error in the minds of every one of us who think of this disease, and we are being more or less deceived by the form of language handed down to us by our ancestors; for you must remember that in pursuing this subject Dr. Peck has told you of the fact that the tooth itself was regarded as the offender, that it was inflammation in the tooth that caused caries, and the disease was a disease of the tooth structure originally, which ended in the destruction of that structure. Therefore we are continually speaking of decayed teeth as bad teeth, poor teeth, etc., and using phrases of this description in connection with them, as was done formerly, notwithstanding the fact that we have determined very positively that the cause of decay is a something acting from without upon the tooth and consequently may act upon a tooth of the best structure as well as a tooth of the poorest structure. So as regards decay our language is deceiving us.

Now, what may be the facts in regard to hard and soft teeth in relation to caries is a matter absolutely unknown to-day by any scientific test—a field that has, up to the present time, not been subjected to any scientific investigation whatever. We have been talking of adaptation of this or that material to soft teeth, and the adaptation of this or that material to hard teeth, yet we have had no investigation of this subject of hard and soft teeth, and really know nothing about it from a scientific standpoint. From the most reasonable estimate we can make after we trace the cause of caries, it makes little difference whether the teeth be hard or soft so far as caries is concerned. We find that the matter of cleanliness is the important factor. We may say it is a filth disease, or in other words, it is generated always by the fermentation of mate-

rials lodging about the teeth, and the teeth are acted upon, not because they are soft or hard teeth, but acted upon whether they be soft or hard. If we can keep the teeth clean and prevent fermentation we will not have this action. That is proven to us to-day when we see cavities in teeth the walls of which have so broken that they are continually rubbed under mastication. This is a sufficient hint for us to follow the lines of food excursion over the surfaces of the teeth in mastication, in trimming the margins of our cavities. We should determine the lines followed by the excursion of the food upon the teeth in mastication, and so form the margins of our cavity. When these are cleaned by the excursion of food upon the teeth we will not have recurrence of decay—the failing we are so much troubled with to-day, less to-day than formerly, but still more than we should be. These are practical lessons of importance to us. I cannot now take time to go into a general discussion of these lines. This brings us again to the question of softness and hardness of teeth. What are the principal hereditary faults of the teeth that exist? They are simply faults of form. The forms of contacts are bad. We know that a certain person belongs to a certain family on account of the form of features, and we find certain forms of the teeth are transferred from parent to child, and bad forms are such as to hold lodgments of food.

I feel I must say a word or two about this matter of soft and hard teeth. A patient comes to us, perhaps a young girl whose teeth we have filled. They are hard and dense, and we have done fairly well. Our fillings have been successful, no teeth having been lost. She comes to child bearing finally, and all at once we find these teeth breaking down. Then we have a young man who is grown up, under our care, who goes into the milling business at his maturity, and we find his teeth all at once breaking down. Another man selects a different vocation. May be with a different result. May be not.

Some of them come to us with what we call good teeth. Our fillings are very successful, but some two or three teeth break down, no matter what vocation they may follow, and we will say that these teeth have become soft. This other patient, the little girl, comes into your hands, and we say that her teeth are soft and bad. I wish to say this is a deception, partly from the language that has come down to us to express our thoughts about these

cases, partly from the appearance presented, partly from the feel under our excavator because that excavator is coming in contact with tissue that has been softened by the acids, that have been formed by the fermentative processes. I want to remind you that a tooth is the hardest substance of the body, that is, it possesses the least reparative function. It undergoes processes of change the least of any tissues of the body—I mean soften or harden, or change, the least of any tissue of the body. I am carrying on a long, tedious process of examination as to the density of teeth, in reference to their liability to decay, but my investigations have not gone far enough for me to speak especially of that now. But I find as a fact that the tooth of a child of fourteen is as heavy as the tooth of a man of fifty. Its specific gravity is as great. That fact stands out prominently in spite of our ideas that the tooth hardens as the person grows older. What does this teach us? The simple fact that there is something else happening there besides vital changes in the teeth.

There is something happening to the fluids of the mouth where these teeth are breaking down. There is something happening to the fluids of the mouth where the teeth are decaying. What is it? That something else is a change in the condition of the fluids of the mouth, a change by which fermentive processes are rendered less active in the one case, and a change by which fermentation is rendered more active in the other case.

Now, this is the direction that investigation upon this subject must take in the future. It is a direction in which we have not gone any distance as yet. We know that there are certain micro-organisms of the mouth that we cannot cultivate artificially. Some of us have tried it over and over again, and we are unable to cultivate them at all. The leptothrix buccalis we find in almost every mouth. If we put these in a tube they fail to grow, no matter what media we employ. There are some influences we do not yet understand that are so potent to these organisms that they refuse to grow. Then there are other microbes that we can get to grow in our culture tubes, indeed will grow almost anywhere. What the changes are that are causing differences in the fermentive processes in the mouth, and which we have been speaking of as hard and soft teeth from the nature of the language that has come down to us we do not know definitely.

This is the direction I hope our younger men will follow up

and tell us what they are. Then we may be able to prescribe certain drugs, or certain hygienic regulations for our patients in the future that will stop caries of the teeth. Instead of filling cavities that have formed, we will stop the process of the production of caries by changing the condition of the fluids of the mouth, rendering them healthful, and preventing caries in the future. How long it will take to do this is unknown, but gentlemen, the time is coming in the future when we will give drugs to stop decay. It is coming, for certainly, if we continue our studies, we will find out these secrets. It is only a question of years, of continual study until we will arrive at this point. For the present we must do the best we can. We must study the processes by which we can combat the disease as we now find it, and study it carefully, and in this way we will proceed step by step in guarding the teeth of our patients against decay until in the future we will find out a better method.

Dr. Edmund Noyes: I want to suggest a very limited field for the probable action of another exciting cause of dental caries in addition to the one mentioned in the paper. If I understood the paper rightly, the author made no account of any exciting causes of caries outside of fermentation. In a limited number of instances the fluids of the mouth themselves, the acid mucus or acid saliva, or the acid character of the mixed fluids of the mouth may have a decided action in the production of caries. We have seen instances in which decay occurs along the gum margin, upon clean surfaces and apparently caused by the direct action of the mucous secretion. I think we have most of us seen a very few instances in which the appearance in the mouth would indicate that the salivary fluid attacks the tooth, and we see such teeth going hopelessly to ruin regardless of anything that can be done for them, unless by such treatment as would change the character of the fluids of the mouth themselves. Such teeth decay faster in the lower part of the mouth than in the upper part, and show lines of decay at the ordinary level of the fluids of the mouth, especially near the gum line, and such cases show decay upon the lingual as well as proximal and buccal surfaces, and progressively the teeth decay in a way that it is almost impossible to account for upon the supposition of fermentation of food, for such mouths are sometimes clean. I do not think this cuts very much figure in the general question of caries of the teeth, but it seems to me there is enough

of it, so that it should be considered, as it seems about all that is left for us to claim of actual knowledge in regard to caries of the teeth previous to the knowledge which we have lately received through the investigations of Professors Miller and Black.

There is one other cause of destruction which I want to refer to in a few words which is not caries at all, namely, true absorption, which is quite rare, and is closely analogous, if not exactly similar, to the loss of the roots of temporary teeth by absorption. We find such cases occur only in portions of the roots of teeth covered by the gums, and the growth of the gum occupies the space destroyed. The hollow cavity is always filled with the gum, and the destruction is evidently a digestion of the solid substance of the tooth by the secretion or destructive action of the cells of the connective tissue. I saw a case of that sort not long ago in which a cavity upon a lateral incisor extended from the gum margin about one-third the length of the root. It was wholly concealed by the gum. It was evidently and unmistakably a case of true absorption and not caries. We find such cases in the roots of teeth in various situations, and always under the gum.

Dr. Geo. J. Dennis. With reference to caries of the teeth and absorption, Dr. Noyes, in speaking of it, said he had noticed caries in certain places beneath the margin of the gum. I recall two cases of this kind that I have seen within the last two weeks. One of them was a case of a patient who was afflicted with dyspepsia of marked form. She suffered at the same time from intense pain in the upper left molar. I examined the tooth carefully and found no cavity, until I passed my instrument beneath the margin of the gum, and there I found a cavity which extended probably from two to three lines along the buccal surface of the tooth. The cavity was quite large and the pulp was exposed. After removing the gum as thoroughly as I could, I found none of the same evidences of decay that one would naturally expect. The cavity was followed in the same manner as Dr. Noyes has stated, and there seemed to be absorption, rather than true caries.

The other one was a case of two lower lateral incisors in a gentleman about eighty years of age, which I discovered with the scaler, and supposed was simply a collection of calculus. On closer examination I found there was absorption there in the same way as Dr. Noyes has noticed on the upper teeth. The two lateral incisors, and I think probably a central incisor, were affected in

the same manner. The peculiar thing to me in this case was that there was no congestion of the mucous membrane in the vicinity. The teeth themselves were not sensitive. The situation of the cavities was so peculiar that I had some doubt as to whether the real cause was true caries of the teeth, or whether it was simply absorption, by connective tissue or by means of some secretion from the mucous membrane. I shall be glad to receive some light on the subject.

Dr. C. R. Taylor: I have noticed one form of decay in persons in the habit of holding a quid of tobacco on one side of the mouth. The decay takes place at the enamel margin, then the pericementum is exposed and decay takes place along the gum line. That is one kind of decay I have noticed which is not of the ordinary form. And then another form of decay I have observed occurs in very elderly people along the gingival margins on all sides of the tooth. I have called it senile decay. I only see this characteristic form in elderly people, people who are quite advanced in life. I would like to ask Dr. Black if the cause of both is fermentation. I presume he has noticed those forms of decay in his practice.

Dr. G. V. Black: I have noticed that form of decay we find in the teeth of elderly people, and I have no reason to suppose that it is in anywise different from caries occurring earlier in life except as to position. It is a very dangerous form of decay because it is so often situated near the root canal and exposing this portion of the pulp tissue without very much penetration of dentine. The other class is more questionable, and I do not remember to have made microscopical examinations of that class of caries. It is possible it may not be true caries.

Dr. Taylor: These cases are almost always pitted.

Dr. Black: We find lines running lengthwise of the jaw. The first injury is by the absorption from pressure by the quid of tobacco, then the other injuries follow. What I have termed cervical absorption has been spoken of, and I do not know whether it occurs more frequently now than formerly, but I have noticed perhaps more of these cases than I used to, and I find that others are noticing them. When I first spoke of this cervical absorption I found nobody who seemed to have recognized it.

The case spoken of by Dr. Noyes is found not to be true caries when examined under the microscope. It lacks the characteristics of true caries.

Dr. H. J. McKellops: There is a great deal in this subject, and it takes such distinguished men as Dr. Black to comprehend all of it. We write and read papers on dental caries. Very well; but when we look at the subject from a practical standpoint we see it in a different light. We find erosion or decay at the gingival margin. That is one form of decay. Then we will find another form that occurs on the margins of the teeth. It will run up just like half a moon, attacking half of the tooth. In another instance the top of the gingival margin will be disturbed. Let some scientific man tell me the difference in these forms of decay. I have never heard any scientific man give a good reason why the enamel is scooped out in the form of a half moon. There must be something in the secretions of the mouth that causes that effect. My friend Darby, of Philadelphia, wrote a paper on this phase of the subject and condemned the "horrible toothbrush" that is used by our patients. You doubtless know that I recommend and advocate the use of a toothbrush. I do not believe the "horrible toothbrush" has anything to do with it. It may be the mucous secretions or eructations from the stomach that do this work. I would like to know of something that will counteract this condition. The most difficult work the practitioner has to perform is to save those teeth, especially in the front. It takes artistic work to do that. I want to know why it is all this trouble occurs. These scientific men do not tell me anything about it. I take all of the dental journals and I receive no light on the subject. It is all well enough to discuss this subject of caries, but show me the results of your treatment. Demonstrate to me yourselves some practical work. Show me that you have accomplished something about which you have written so much. Tell me something that I can in turn utilize for the benefit of my patients. That is what I want.

Dr. A. W. Freeman: I only want to say a word or two. As I understood the paper read by Dr. Darby, I do not look upon it in the light that my friend Dr. McKellops has. It was in regard to sharp angles which we find on teeth that seemed as if they were almost worn out by the brush. I doubt whether it is the action of the brush alone, because I have seen the anterior teeth scooped out down to the pulp itself. I regret very much that I did not bring with me some teeth that I extracted four or five years ago where the whole surface was scooped out from the gum margin down half way to the cutting edge of the tooth and beautifully polished.

I do not suppose this is regarded as decay in the strict sense, but as an erosion from some secretion, perhaps lactic acid. We find it more on the anterior superior teeth than elsewhere. But the paper to which the speaker has referred, as having been read by Dr. Darby at one time, did not lead me to think he entirely condemned the toothbrush.

Dr. McKellops: Yes, he did. He spoke of the "horrible toothbrush."

Dr. Peck: (Closing the discussion.) As there has been no fault found with the subject matter of the paper itself, there is no necessity for me to occupy any time in closing the argument, and I therefore yield the time to those who are to follow.

THE RELATION OF THE PROFESSION TO OUR DENTAL COLLEGES.

By Truman W. Brophy, M. D., D. D. S., Chicago, Ill.

To present for your consideration a paper on this subject naturally leads us into a discussion on dental education. It is my desire to avoid as far as possible reference to matter which has been fully discussed, and deal with some new phases of the subject which, I believe to be of paramount interest to the welfare of our profession. The influence exerted by our professional institutions of learning upon the professions, might well be compared with the influence of our public schools upon the people of our country. As the public schools are largely responsible for the character and intellectuality of the nation, so the professional schools are largely responsible for the character and attainments of professional men.

The dental colleges of the United States by concert of action have advanced the curriculum, so that it is to-day more systematic than in other professional schools.

The effort of the National Association of Dental Faculties to unify the course of study in the several institutions, while not entirely successful, has brought the colleges closer together in the methods of teaching and the matter taught than prevailed before the organization of that body.

The extension of the course of study over a period of three years, has made it possible for students to bestow more time upon the practical phases of anatomy, histology, bacteriology, chemistry, technology, etc., besides becoming more proficient in operative and prosthetic dentistry. The changing of the course, therefore, from two to three years has not only met with the approval of the profession, but has been equally gratifying to the faculties; so this relation of our colleges to the profession has been most happy.

"It will not be doubted by any one that it is our solemn duty in the conduct of dental education to see to it that before a student is permitted to enter upon its study he has shown proper aptitude and has already acquired certain fundamental knowledge. It

avails nothing to point to the rare illustrious men who have leaped at a few bounds from the plowshare to the front rank of scientific or judicial eminence, and who have served immemorially as instances to support the fallacies of those who from selfish motives or from ignorant prejudice decry thorough education. Let not the rest of us, only ordinary sons of toil, be misled by the hope of such exceptional careers."

The relation of our colleges to the profession in regard to making our students more proficient practitioners scientifically, as well as practically, is one upon which the colleges and the profession are interdependent. A practitioner may send to a college a student whose educational qualifications for admission are not of as high an order as they should be, and consequently his path to success is a most laborious one.

I cannot better express my ideas on the subject of preliminary education than to quote from Mr. J. Ernest Lane, Fellow of the Royal College of Surgeons, England, who, in an article on medical education and medical practice*, states that too much stress is laid upon the benefits to be derived from what is termed a modern education, and suggests that a judicious admixture of the ancient with the modern would be of more benefit than an exclusive knowledge of either the one or the other. He points out that anatomical nomenclature, and in fact nearly all the technical terms met with in the study of medicine are derived either from Latin or Greek, and that it is necessary to acquire at least an elementary knowledge of these languages in order to obtain an intelligent knowledge of their profession. As bearing upon this subject, he quotes the words of a distinguished member of the profession, who had recently given it as his opinion that, "if a boy destined for a profession, were to be taught nothing but reading, writing and arithmetic till he was 11, and after that nothing but Greek, Latin and mathematics till he was 18, at 50 that boy would turn out a more widely cultured, better read man than if in his early years he had been stuffed with geography, history, philosophy, and the two-penny half-penny fragments of chemistry, botany and zoölogy which constitute school science."

If the views of Mr. Lane were presented to educators of large experience in medical and dental schools, I have no doubt that, after deliberate consideration, they would be heartily endorsed.

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*British Medical Journal, October 7, 1893.

As we look over the directory of American dentists and place a mark opposite the names of those whose writings have made an indelible impression upon our literature, and a profound impression upon the dental mind, we note how few have enjoyed the great privilege of a university education. Had such opportunities been offered and embraced, however, the sphere of usefulness of these leaders in dentistry doubtless would have been materially enlarged.

On the other hand, a practitioner places a student in college whose affluent circumstances and broad preliminary education seem to especially fit him for his long course of professional study. His funds enable him to live comfortably, his education renders his professional study comparatively easy, but is there not another qualification essential to the success of a dentist?

It is my opinion that a course in a manual training school and a certificate of satisfactory work from teachers in such an institution, would be a very important stepping stone in entering the dental profession. Such a preliminary course prepares the student to engage in the manipulation of metals, the handling of fine instruments, and the manual dexterity essential to his success as a dental practitioner. A thorough knowledge of anatomy, chemistry, physiology, histology, materia medica and therapeutics, bacteriology, pathology and surgery, indispensable as it is in rendering a man qualified to practice dentistry, would very poorly indeed prepare him for the duties of his profession if he had not the manual dexterity to skillfully practice operative and prosthetic dentistry. My experience as a teacher—although not extending over many years—has led me to the belief that all colleges should reserve the right to return to a student his fees and dismiss him whenever in the judgment of the faculty he cannot acquire the manipulative skill essential to enable him to practice dentistry successfully. To retain a student who by nature cannot acquire such skill and carry him on through a three years' course of study, and then reject him at the close of his final examinations, seems too unjust on the part of an institution to be excused.

Again, I think a student should never attempt any pursuit, unless he has a special desire to make it a life work or his vocation. I have no faith in the success of an individual who will take up the study of a profession just for a makeshift, or for what money he may possibly see in it. His work must be pursued with

that interest that comes with a love for it, and he must be prompted by the desire to excel, not stand among the mediocrity of his profession, but with a determination to reach the topmost rung of the ladder of professional fame. Opportunity, it is true, may have a great deal to do with that, but a man's will power has a great deal more. A student who takes up the study of dentistry should be impressed by his preceptor with the fact that he has undertaken one of the most confining, laborious and enervating occupations known. It is only by force of habit that the busy dentist is able to get the outdoor exercise necessary to preserve his health.

The necessity of imparting practical instruction to students makes it necessary to have a well equipped infirmary in every college, and patients upon whom all of the operations in dentistry are to be performed. The question of how to supply students with patients has taxed the faculty of every dental college when first organized; and then the profession have in many instances criticized colleges for accepting patients who were not in a financial condition to warrant their applying to a college infirmary for operations. It seems that a matter of this kind should be so adjusted between the members of the profession and the colleges as to be quite satisfactory. It is true that dental college infirmaries often receive and perform operations for persons who are abundantly able to compensate a practitioner for his services, but the question of the patient's financial standing cannot be easily determined by college authorities. On the other hand, it is equally just to say that members of the profession extract many teeth which might be filled with cement or amalgam in a college infirmary for a fee which the patient might well afford to pay. Many such teeth are extracted because the patient would not be able to pay a fee for filling them that would compensate a dentist for his services. Therefore, it seems to me that poor patients, who have their teeth extracted for want of money to have them treated and filled should instead of having them extracted receive a certificate to a college infirmary, issued by the dentist, stating that this patient's circumstances are such that he should be admitted to an infirmary and receive such treatment as is necessary.

This brings us to the question of the relation of the profession to our dental colleges. The colleges must have patients that they may teach practical dentistry. The colleges should not receive

patients who are financially able to compensate dentists for their services. Members of the profession should not extract teeth which are susceptible of being treated and filled, on the ground that the financial condition of the patient will not permit them to spend the necessary time to treat them and put them in a healthy, satisfactory condition, but should in all such cases issue a card to such a patient and send him to a college infirmary, where such a card should admit him to treatment.

Having given the matter some consideration, I believe that not more than 20 per cent of the population of the United States employ dentists for the purpose of treating and preserving their teeth. The remaining 80 per cent do not engage the services of a dentist for any other purpose than for the extraction of teeth and the insertion of artificial ones. I do not make this statement from gathered statistics, but as an estimate made in a general way. Let us assume that there are 800 dentists in the city of Chicago, with a population, in all probability, of at least 2,000,000 of people, and each dentist treats and fills teeth for 500 people during a year. This would make 400,000, or 20 per cent of the entire population of the city, the remaining 1,600,000, if this statement be correct, would employ dentists only for the extraction of teeth and making of plates. It seems unnecessary to state to this Society that the work devolving upon us, and especially to the residents of Chicago, in educating this 1,600,000 people up to the value of the teeth and the advantages to be derived by preserving them, is a greater work than the most earnest educator has contemplated.

The mission of the dental college has long been supposed to be for the preparation of young men to engage in the practice of dentistry. Its teachings have elevated dentistry and placed it on a higher plane than it otherwise could have taken, but its usefulness is by no means limited to the preparation of students for dental practice. In my opinion its most important work is in educating the public to an appreciation of the great benefits which are bestowed upon them by scientific and practical dentistry.

Many a young man is quite willing to assert that the nucleus of his practice was the patient whom he first met in a dental college infirmary.

The law governing the practice of dentistry in the State of Illinois has accomplished a great deal for the profession and for the public. The benefits that the profession have derived have

been in a realization that men entering upon practice in our State have been required to present credentials authorizing them to practice or take a State Board examination. It is true that our law has certain defects which should be amended, and in speaking upon this subject I feel that it comes within the province of my paper, for it is the relation of the profession to the schools from which our ranks are augmented. I believe that the Illinois State Board of Dental Examiners has endeavored from the time that the Board was first organized up to the present to conscientiously discharge its duties. I am also aware that it is impossible for a body of men acting in that capacity to please every one, and what I shall say in regard to the relation of the Board to colleges and to the profession is not said in a spirit of fault finding. It is not with a view of hurting the feelings of any one, but certain facts confront us, and it seems that steps should be taken to correct what is generally regarded as an error. The National Association of Dental Faculties, by increasing the course of college study from two to three years, did so that young men might become more proficient in dental knowledge. It seems, therefore, that the portals of the profession should not be entered by a shorter path. It has transpired on several occasions that permanent licenses have been issued by our State Board to young men who have had but a single course of study; and so their further study has been discontinued, and further proficiency has not been acquired. I do not believe it is the desire of the State Board of Dental Examiners to lower the standard of the profession by admitting to our ranks men who should pursue their studies further and complete their professional education. The relation which the profession should bear to the colleges should be to aid them by counsel and friendly intercourse in the discharge of their momentous duty, and send to them only such young men as are qualified by nature and by education to intelligently pursue the study of dentistry. The practitioner's further duty is to support the infirmary, as far as can be, by sending patients to it who are unable to satisfactorily compensate him for his services, so that students may have an opportunity to acquire practical knowlege and that "delicacy of manipulation which comes only with experience."

Another suggestion I might make to the profession is to visit the dental colleges more frequently and by their presence stimulate the students to make their very best efforts.

Next, the duty of the colleges to the profession should be to guard their entrances and their exits, admit only such young men as possess a good education, watch them carefully, advance them practically and scientifically, and in the event of their failure to become skilled in the operating room and laboratories, they should reserve the right to return them their fees *pro rata*, and advise them to engage in some other vocation.

Another duty of the colleges to the profession should be to require certificates from persons whose financial ability to compensate a dentist for his services is at all questionable, and upon such certificates admit them to the privileges of the college infirmary.

So then let the State Board of Dental Examiners, the National Association of Dental Faculties, the profession, and the colleges labor unitedly to advance our profession, so that our unprecedented achievements during the quarter of a century just closed may be rendered incomparable with those yet to come.

DISCUSSION.

Dr. R. N. Laurance: Mr. President: I do not feel equal to this task for certain reasons, and I hope you will kindly bear with the way in which I shall present what little I have to say on this occasion. The subject which has been so ably presented by Dr. Brophy is one of deep interest, and he has certainly presented the college side in a very thorough manner, and I hope I may be pardoned if I allude in the discussion to certain points presented in the paper, especially those relating to the dental law and its results, for I am well aware that there are others more competent than myself to discuss this phase of the subject. The questions involved should not be considered with reference to individual views or circumstances only, but they should concern the highest interests of the dental profession and the public in relation to dentistry. How to fit a man most thoroughly for this pursuit is an important question. The paper states that the colleges and the profession are interdependent, they ask the support and co-operation of the profession. How shall we surmount the obstacles in our pathway? Instead of denouncing the dental colleges, let an endeavor be made to strengthen the best of them. How shall we do this? By sending them only well prepared students. Here lies the whole secret of our advancement. Organize earnest effort for the better education of dental students. The private preceptor

should see to it that the student is well grounded in the fundamental branches and general principles. If we could adopt some way by which all dentists could be induced to become members of dental societies, there would be much less difficulty in supplying our colleges with properly prepared material. Dental colleges are in the main compelled to accept all comers, hence the competition of so many schools has a tendency to lower the standard of requirements. Dentistry is too broad a specialty to be taught except by those who have thoroughly studied and practiced it. A uniform grade of teaching and scholarship in all our colleges is very desirable. In my opinion the appointment of a Board of Regents in each State, empowered to examine applicants for diplomas in our colleges, would advance the grade of qualifications.

Dr. C. B. Rohland: Dr. Brophy, in his paper, has not at all overestimated the value or importance of the work done by our dental colleges, in raising the standard of dental education to its present proud position, and it is with pleasure I take this opportunity to express my hearty appreciation of their success and yield to them the credit which is so justly theirs. In order, however, to form a correct and just estimate of their noble work, it will be necessary to take into consideration the forces which have served to bring about this satisfactory state of affairs, for back of all this forward movement in dental education will be found dental laws, and the creations of dental laws, dental boards. In giving credit then for the good work already accomplished, in order to be just, the efforts of dental boards, throughout the country, in creating a situation which rendered possible this upward movement among colleges, must not be forgotten, and especially is all honor due to our own State for the Illinois board was one of the leaders in this movement. I feel that I can speak in this way with perfect propriety, notwithstanding my previous connection with the board, because I became a member after all this work was done, and served only long enough to enable me to appreciate its importance. Although dental legislation began over fifty years ago, it was not until 1868 and 1869, that the sentiment in the profession in favor of dental laws had crystallized sufficiently to bring about a concerted movement for their adoption. One State after another slowly dropped into line, but so slowly, that in 1881, when Illinois finally succeeded in having a dental law passed, it was only fourteenth on the list. It must be remembered too, that the law as passed, and

as it still stands, is only a compromise, a compromise with objecting elements, in order to overcome opposition. Concessions had to be made here and there until finally the result was only an emasculated shadow of what was really desired. In view of this, it seems to me that Dr. Brophy is not altogether just in his criticism on the action of dental boards, in occasionally licensing undergraduates to practice.

In the first place, in this State I know, the occurrence was very rare, and I believe it was just as rare elsewhere, but when it was done, it was done because in the judgment of the board it could not be helped. Right here is where a lamentable defect in our own law crops out. The law is mandatory. Any one is entitled to come before the board to be examined, no matter who he is, or where he comes from, and if he proves himself equal to the requirements, the board is bound to give him his certificate, whether he is a first course student, a second course student or no college student at all. The board has no more discretion in this matter than any other college would have to withhold its diplomas from the students who had complied strictly with all its requirements. Criticism of this kind lies against the law itself and not against the machinery created to carry out its provisions. But to return, about the time of the adoption of the law in this State, with but few laws scattered about here and there, with no unity of action between the examining boards, with but crude ideas of the scope of restrictive legislation, the situation at that time placed very few obstacles in the way of those, whom the laws were especially intended to reach. At the same time the impression got abroad that there was money in a dental college. In consequence dental colleges sprang up like mushrooms all over the country and the supply was largely in excess of the demand. Some of these were of course organized by men who sincerely desired to improve the educational status of the profession, others were the outcome of more ignoble motives. The sharp competition for patronage necessarily had its effect and even the best, the most honorable of our institutions found it difficult, not to say impossible, to keep up to the high ethical standard which they would have been glad otherwise to adhere to. The cause of dental education suffered and was dragged into a slough of despond, which culminated finally in the Delavan and other scandals. It cannot be controverted that at that time, the moral tone prevailing in our educational circles was

not just what it should have been, and to clear the atmosphere, and help reputable and honorable colleges to keep up and gradually elevate their standard, was the noble work laid out for dental boards. The Illinois State Board, composed at that time of such men as Drs. Cushing, Harlan, Black, Judd, Koch, and others, fully comprehended the needs of the time, and took the lead in the movement which finally culminated in the National Association of Dental Examiners, the fruit of which was the general adoption of dental laws all over the country until now forty-six States and Territories are within the pale, the further result of which also, was the adoption of the three year rule, for your board, gentlemen, was the first to adopt this requirement, and it was Dr. Koch, a member of your board, who introduced and secured the adoption of this in the National Association of Boards of Dental Examiners. In this way dental boards created a sentiment and a situation, without which support it is but logical to assume that the colleges would still be struggling with the difficulties of the past, and the status of dental education would be years behind its present satisfactory position. Dental boards made it easy for colleges to elevate their standard, because it made it impossible for other colleges to live, who from selfish motives would have failed to follow.

The impression that a few have been trying to create, that dental boards were hostile to reputable colleges, that their efforts in making their requirements stricter, and exacting the compliance of the colleges, were only due to their desire to exercise a little brief authority and to lord it over better men than themselves, was a most cruel slander. True, here and there, where political considerations ruled the appointing power, incompetent, cross-road politicians may have at times slipped in, to the detriment of the service, who may have exercised the duties of their office for their own personal benefit, yet in the main, happily, such appointments have been rare, and the work has been carried on with an unselfish devotion to both public and professional interests, at a sacrifice of time and energy, and money, which is deserving of honorable recognition. Instead of being a hindrance in the way of dental education, instead of being a stumbling block to colleges, dental laws and dental boards have been their best, their most powerful allies. They have enabled them to reach a plane, to acquire a prosperity, it would have been impossible for them to reach by this time without their assistance. A comparison of the

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percentage of graduates in this State in 1881, when the law first went into effect, with the percentage at the present time will, in a most startling way, corroborate the truth of this. No one is better able to speak with authority on this subject than Dr. Koch, who for so many years, with an unselfish devotion to public and professional interests, at the sacrifice of private comfort and purse, did so much in putting this State in the van in the cause of dental education and dental legislation, and I trust that now the subject is before the society, he who helped so nobly to make history will see to it that it is properly put on record, before those who took such leading parts are no longer here to speak. By all means, gentlemen, give the colleges their full mead of praise, and yield them the hearty support and coöperation, which Dr. Brophy so justly asks of you. What I have here stated, however, are facts, and it is but right that the profession should know the truth, that they may understand how much of the present satisfactory condition of our dental colleges is due to dental legislation, due to the efficient work of dental boards, and how much, too, was due to the wisdom and progressive spirit of our own State Board.

Dr. C. R. E. Koch: The status of dental education of to-day, as shown by the paper, is particularly gratifying, but in the interest of historic truth I feel impelled to say a few words. It must not be forgotten that the change for the better, as compared with twelve years ago, is largely due in this State at least to dental legislation, poor as this is. It had the effect of sending young men to college and thereby created a demand for colleges in this State and encouraged able and competent men to become teachers. The administration of the law by an ever conscientious and judicious board whose examinations, even in their imperfectness, had the effect to make many aspirants who found themselves unfit to pass the ordeal of this board, to enter college and thus led them to begin their preparations properly.

The essayist has referred to the fact that junior students were at times granted a license to practice by the board upon its examination, and thereby were led to abandon the completion of their collegiate course. This is probably true in a few instances, but it was the fault of the law and not of the board which is compelled by the statute to give any one an examination who applies for it, and if he comes up to the standard of information required must receive a license to practice. These cases, however, were in the

earlier history of the board. More than a year before the establishment of the three years' standard in colleges the Illinois State Board passed a rule that it would consider no applicant as competent who could not first show three *full years* of previous instruction. This rule made it easier for the intending practitioner to graduate from a college, so far as the matter of time was concerned, than to receive the license of the board upon examination. At that time the student could complete his two year collegiate course in a little over one calender year, if he took his courses in separate institutions.

The percentage of dentists in the State of Illinois, who were graduates from colleges when the law was enacted, was about twelve. Since that time ninety-five per cent of those who were admitted to practice were graduates of reputable colleges and the other five per cent have given evidence of their qualifications to the authority of the State. This to my mind is proof positive that the Illinois Dental Board did not give much encouragement to the avoidance of a collegiate education. The formation of the National Association of Boards of Dental Examiners, which is only a conference body, having no authority in itself that it can enforce, has, through the inherent legal powers given to its component members in their several States, exerted an immeasurable influence upon the colleges, their educational work and the present advanced standard of requirements. It said to its brethren of the faculties: Your colleges must become in reality educational institutions. If some of your institutions are not organized primarily to educate but for ulterior purposes, you must change your course or we will in duty bound be compelled to discredit your graduates. It insisted upon a higher plane and more uniform course of instruction, and its influence kindly, earnestly and firmly impressed, led the colleges represented in the Faculty Association to adopt all that the essayist, as well as every one of us, is now so proud to know is the present plane of dental education in this country.

In contemplating the present advanced position, let it not be forgotten that it is a result very largely due to the impulse and influence primarily of dental legislation, and secondly to the faithful, energetic and unselfish efforts of members of State boards, kindly seconded and encouraged by honest teachers possessed of love and ambition for our profession.

Dr. C. N. Johnson: One word in relation to a matter touched

upon by Dr. Koch in his remarks. It has been stated that under graduates have been granted permanent permission to practice by the State board, and thus deprived of further college teaching. I do not want to say anything about depriving a student of further college teaching, but I desire to refer to the methods of examination as followed by the board in the past. I believe that the board has in its power the regulation of the examination. Now, a weak point to my mind in the examination as conducted by the board has been this: Candidates have been brought before the board, subjected to written examinations, and given permanent licenses to practice without the board seeing any practical demonstration on the part of the applicants. I believe this is a weak point in the examination. This is not a criticism of the board personally. I admit that the board has been handicapped, but it certainly seems to me that this matter should be remedied. What little experience I have had with students leads me to say this, that I would sooner send a man out to practice his profession on the public, judging of his capability for doing the public justice by standing beside the chair one hour watching him operate, or going into the laboratory for one hour and watching him work and demonstrate there, and not seeing anything else from him, not seeing a paper written by him, and on the strength of his practical ability grant him a permanent license, than I would a man whom I never saw operate, no matter what kind of papers he turned in on examination. I believe his possibilities of doing justice to the public are greater, and that he is better qualified to practice his profession as a dentist if he is possessed of good manipulative ability and good common judgment than if he wrote excellent papers and knew very little about operating.

Referring to the subject matter of the paper, every member of the profession practicing who is interested in the colleges has a perfect right to go into these colleges and see the class of work that is being done, and I have no doubt that the colleges will be glad to receive suggestions from members of the profession. The judgment of the whole profession is vastly superior to that of the best faculty that ever lived. Colleges have an important duty to perform both to the profession and to the public, and the more I have to do with this work the more I am impressed with the seriousness of it. I want to say to those who have not had experience in teaching that they little realize the serious position that men are placed

in when called upon to instruct young men to make them qualified to go out before the public and do the profession honor and the public justice. It is a very serious position and the teachers in dental colleges are ready to receive suggestions from all thinking men in the profession.

Another point touched upon in the paper was this: When a student has been long enough in college for his teachers to discover the fact that he is not qualified by nature, instinct, temperament, or any other capacity to make a good dentist, there should be some regulation, some law to empower the college to refund him his fee and reject him at that point. It is a most serious thing to carry a student along one year after another and try to hammer the fundamental principles into his brain, and the mechanical ingenuity into his fingers, and then find that he cannot become a good dentist. I hope some movement will be started before long whereby colleges will be empowered to tell a student after they have studied him carefully, that he is not qualified to make a dentist, and advise him to seek some other pursuit—possibly the ministry. There are too many misfits in the dental profession already. If anybody can suggest any method by which the colleges can be empowered to do this, I believe the colleges will be glad to bring about that state of affairs. The time has come in dental education when colleges should not be called upon to graduate men who are not qualified to become good dentists.

Dr. Edmund Noyes: I am a little surprised at some of the remarks made by Dr. Johnson. It is very wonderful to me if an educational institution has not the power to dismiss a student who does not fill the requirements of the school in respect to scholarship, behavior, or anything that is essential to the conduct of the course of study.

Another thing I will say while on the floor. Dr. Brophy in his paper gave five hundred as the probable number of patients a man could take care of in a year. At the time he was speaking of it I happened to think how many pages and accounts there are on the record books which I have used in twenty-five years' practice. It will not foot up more than about one hundred and fifty or one hundred and seventy-five patients a year in my practice.*

*A re-examination since the meeting shows that although the total number of patients divided by the years of practice is as stated above, the same patients have come back in successive years in such numbers as to make the number stated by Dr. Brophy about correct for those treated in one year. E. Noyes.

DR. W. A. STEVENS: Some time ago I spoke in relation to dental education, and that was at one of our meetings held in Rockford. The remarks I made at that time did not get much sympathy from the profession on account of the position I then took of the requirements of a dental student. I insisted at that time that he should be required to present a certificate of graduation from at least an academy or a high school before preparing to enter any dental college or the office of a professional dentist for the purpose of study. I stated also at that time that any man who had a collegiate education and went into the dental profession to study would be among the leading men in the profession in the future.

I want to call attention to a little matter that I would urge upon every member of this Society to assist in as far as possible in procuring a new law at the next session of our State Legislature. I want every one who is a member of the dental profession to become a member of the Dental Legal Association of the State of Illinois. I want every individual member of the Association to get a pledge from his representative in his district to work for the dental law. It is the purpose of the Dental Legal Association to send a copy of the bill to every member in Illinois, to lay it before them, so that we may have it perfected and passed at the coming session of the legislature to regulate the practice of dentistry in such a way that we will not have practitioners in the city of Chicago and in the smaller cities throughout the State advertising their parlors where teeth are filled and crowns built for a small sum by those who studied in a college or dental office. Some of these fill a whole page of the Sunday *Tribune* with their advertisements. Let every member go to work and assist us in the passage of a law. We desire the assistance and efforts of every member of the profession throughout the State to enable us to control this manner of practice.

I wrote a dentist in the central part of the State, requesting him to see his representative and talk with him in relation to the bill then before the Legislature during its last session, to see if he could not secure his efforts to get it through. What was the answer? His representative said: "I cannot see any use of you fellows trying to get such a bill passed. Anybody can fill and pull teeth." That is the idea and extent of the knowledge of dentistry of the gentlemen who represent the State of Illinois in legislative session.

I would like to ask how many are aware of the number of registered dentists there are in the State of Illinois as required by the present law? There are not two thousand. There are ten counties in which there is hardly a registered dentist. We must pass some measure in some way by which we can rid ourselves of these individuals, or else we are going to be considerably in the mud for years to come.

With reference to dental education I desire to refer to a little incident that occurred in Michigan. While in Detroit a few years ago, with Dr. Metcalf, he informed me that they had been examining a gentleman from Canada, who wanted to practice dentistry in the State of Michigan. I asked him how he got along with the applicant? He said that so far as his written examinations and his knowledge of the literature of the subject were concerned, they were all that could be desired; but when we asked him simply to put a rubber dam on a tooth, he could not. He had no knowledge whatever of operative dentistry. He was equally awkward and ignorant in the laboratory, and was refused a license to practice in the State of Michigan.

Dr. C. R. Taylor: I understood that the subject of the paper was the relation of the profession to our dental colleges. The discussion so far has been largely on the relations between the State Board and the colleges. It seems to me the modern methods of teaching at the present time are revolutionary, and I would suggest to the teachers in dental colleges to read the late report of W. T. Harris, Commissioner of Public Instruction, in reference to methods of teaching. I think the professors in our colleges would be benefited by simply looking over what he recommends in the common and public high schools or educational institutions. They will get hints that would materially aid them in instructing dental students at the present time. In the public schools pupils are made to stand up and spell words without knowing their meaning. This method is the cramming method. I do not think this is the right way to instruct. What is needed in all schools is self-development, self-reliance. Students coming out of our colleges are simply imitators of their instructors. They are not individual. They depend too much upon some method that some one person has taught them, instead of principles.

One of the relations between the profession and the colleges is the suspicion that too many colleges of the present day are

largely manufacturing institutions. I mean by that, manufacturing dental institutions, for the money there is in them. That suspicion will continue as long as colleges are private institutions. What the profession needs to-day is to send better material to the colleges, and there are colleges, I am glad to say, with professors connected with them who have no private interest in the success or the number of students in an institution as a financial problem. Let us, when we can, send students to a regularly endowed or State institution, then we may expect that the chief interest will not be a financial, but an educational one. (Applause.)

Dr. BROPHY, (closing the discussion): I have but a few words to say; first in regard to the remarks of the gentlemen who were formerly on the State Board of Dental Examiners as to the manner of conducting examinations. If there was any one question which I desired brought out more conspicuously than any other in my paper, it was with reference to this point, which is so apparent that it scarcely admits of any discussion, namely considering the brief period of time that students are in contact with these gentlemen, it will not enable them to acquire a knowledge of their practical attainments. As has been stated by Dr. Johnson, it requires close study extending over a period of years to determine as to a man's qualifications in practical matters, and how can we expect a board of examiners in the brief period of time, perhaps a week, with which they are in contact with these men, to determine how much they know practically about dentistry. As has been remarked by Dr. Stevens, a man may write a paper that is absolutely free from adverse criticism, but would he be admitted to the profession on that? That is just where the trouble lies. I believe the board has done everything in their power so far as they could to determine candidates' qualifications, but it is absolutely beyond the possibility of a set of human beings to determine as to a man's practical knowledge in the brief period of time that the board is in contact with these applicants.

I have a suggestion to make and it is possible it may be put into practical shape and carried out through the medium of the Association of National Boards of Dental Examiners. In all States where dental colleges are conducted, let the boards take it upon themselves to examine the practical work of students who are engaged in studying in these institutions. Let the State Board of Dental Examiners in Illinois spend two or three weeks in the colleges, notice the

work that is being done by the students, and form an opinion as to its merits. We may be able to secure an amendment to our law. The bill, as passed in 1881, was better than anything we had previously had, and operated very well for a while, but finally its defects were recognized and taken advantage of. The point is this: The State boards of the various States have a duty to perform, and they will do it. By visiting the institutions they can determine as to the practical knowledge and ability of men, especially those that are in the lower scale. An army cannot march without having some men behind, and so a dental college cannot be conducted without having some students far advanced and others dragging along in the rear ranks. Those in the rear ranks are the ones that need the careful, earnest consideration of the State Boards of Dental Examiners, for the board is the guardian of the people. Now, why cannot that be done in all of the States where colleges are in operation? I see no reason why it cannot. I think it is practicable, and I believe it should be done. If the boards cannot by any means arrange to do that they will have to be partly responsible. The course is now extended to three years. I predict in the near future that this course will be extended to four years. The ranks of the profession will be benefited by such a procedure.

Dr. Noyes criticised a statement made by Dr. Johnson by saying that he was surprised to hear that an institution had not the right to dismiss a student if he did not have certain qualifications. I do not believe in the infallibility of laws, but I have an opinion from a good lawyer on that very subject. I had on one occasion—through the faculty of the college with which I am connected—a desire to dismiss a student. The young man entered the college, paid his fees, was assigned to a seat, and the card issued entitled him to the privileges of the courses of instruction. We consulted an attorney, and he rendered an opinion to the effect that the young man had a legal right to his seat in the institution, and to receive the courses of instruction given by the members of the faculty and demonstrators, and it was not within our power to deprive him of that right. If by any means we could compromise with him and get him to withdraw we could do so. We attempted that and failed. He remained with us five years and was rejected two or three times. I believe the attorney was right in this case. If a man buys a railroad ticket he is entitled to all the privileges

of that ticket. The same thing holds true if a person buys a ticket for a seat in a church or a theater, and the authorities of the institution, unless the man's deportment is bad, or is such as cannot be tolerated in good society, cannot force him out. I think our institutions could make a statement in their announcements to the effect that gentlemen who do not show progress may be dismissed, the same as they do in Cornell and other universities. If a student does not keep up with his branches of study he is dismissed ; they do not want him.

I will say in reference to the remarks by Dr. Taylor, that there was never a dental college organized that made any money if it did its duty to the students and to the profession. There is an idea prevalent among many people that a dental college is a veritable bonanza. If there is any gentleman here who thinks that such is the case, he is mistaken.

SWAGED ALUMINUM PLATES.

By Geo. D. Sitherwood, M. D., Bloomington, Ill.

Aluminum is never found in a pure metallic state. Stocker once made the statement that aluminum occurred as shining scales in an alumina formation near St. Austel, in Cornwall County, England, but he was in error; yet there is no other metal which is so widely scattered and occurs in such abundance. Aluminum is found in combination with oxygen, fluorine, silicon, the alkalies and acids, existing in such quantities as not only to form mountain masses, but also the bases of soils and clays.

About 1760 Morveau called the substance obtained by calcining alum—alumina. Afterward when Lavoisier first suggested the existence of metallic bases of the earths and alkalies, and alumina was suspected of being the oxide of a metal, the metal was called "aluminum." This was many years before the metal was isolated. The first practical researches in the preparation of aluminum date back to 1807. Oérsted in 1824 decomposed anhydrous aluminum chloride by potassium amalgam, and obtained along with some potassium chloride, an amalgam which when decomposed by heat furnished him a metal resembling tin. In 1827 Wöhler isolated it by decomposing aluminum chloride by potassium; the metal was in the form of a gray powder, taking the brilliancy of tin under a burnisher. In 1845 Wöhler obtained the metal in small malleable globules of metallic appearance, by making vapor of aluminum chloride pass over potassium placed in platinum boats, but the metal thus obtained was very impure and scarcely as fusible as cast iron, being no doubt alloyed with the platinum in its preparation. It is to H. St. Claire Deville that the honor belongs of having isolated aluminum in a state of almost perfect purity, determining its true properties in 1854. If Wöhler was the discoverer of aluminum, Deville was the founder of the aluminum industry. On March 20, 1854, he announced to the French Academy in a letter to Dumas that he had produced aluminum without alkaline help, by the battery, and sent a leaf of the metal thus obtained. Bunsen

succeeded in obtaining aluminum by the battery about the same time by a method similar to Deville's. Thus it is evident that the isolation of aluminum by electrolysis was the simultaneous invention of Deville and Bunsen.

At the beginning of 1855, Deville established himself at the chemical works at Javel, in France, in a large shed which the director M. De Sussex kindly put at his service. Such success attended his efforts here that on June 18, he presented to the Academy through M. Dumas large bars of pure aluminum, sodium and masses of aluminum chloride. The expense of all the experiments and work at Javel by which Deville was enabled to place the aluminum industry on a firm basis, was borne by the Emperor Napoleon III. So it seemed fitting that the first article made of aluminum was in compliment to the emperor, a baby rattle for the infant Prince Imperial, the Prince who afterward fell in a battle with the savage Zulus of Southern Africa. It was the metal made at Javel under the direction of Deville which was exhibited at the Paris Exposition in 1855. He had for his assistants two young men, Charles and Alexander Tissier. After assisting him for about two months in setting up his apparatus they were forced to leave the works on account of a misunderstanding between them and M. de Sussex. They were admitted to Deville's laboratory at the École Normale, and initiated by him into all those processes which they made use of afterward, then suddenly left, taking drawings of furnaces, details of processes, etc., which they not only made free use of, but even patented. In July, 1855, M. Chann, an honorable manufacturer of Rouen, established works in which Deville's processes were to be applied, and intrusted the direction of it to the Tissier brothers. In 1858 the Tissiers wrote and published a small work entitled "Recherchés sur l'Aluminum," which in view of what Deville could have written about the subject was a decided misrepresentation of the results thus far accomplished. Deville thought the industry was yet too young to merit any sort of publication, but the Tissier's book no doubt stimulated his efforts in writing his noted work "De l'Aluminium," in 1859, in which he acknowledges the writing was due to his pride wherein he decided to take the pen to speak of his work "only to avoid seeing it belittled and disfigured." He concludes his book with these words: "I have tried to show that aluminium may become a useful metal by studying with care its physical and chemical

properties, and showing the actual state of its manufacture. As to the place which it may occupy in our daily life that will depend on the public's estimation of it and its commercial price. The introduction of the new metal into the usages of man's life is an operation of extreme difficulty. At first aluminium was spoken of too highly in some publications, which made it out to be a precious metal; but later these estimates have made it out attackable by pure water. The cause of this is the desire which many have to see taken out of common field-mud a metal superior to silver itself; the opposite opinion established itself because of very impure specimens of the metal which were put in circulation. It seems now that the intermediate opinion, that which I have always held and which I express in the first lines of my book, is becoming more public and will stop the illusion and the exaggerated beliefs which can only be prejudicial to the adoption of aluminium as a useful metal. Moreover, the industry, established as it now is, can be the cause of loss to no one; as for myself, I take no account of the large part of my estate which I have devoted, but am only too happy, if my efforts are crowned with definite success in having made fruitful the work of a man whom I am pleased to call my friend—the illustrious Wöhler."

Beauxite and cryolite are the minerals most used for producing aluminum and their preference lies mainly in their purity. I have here some fine specimens of beauxite, a hydrated aluminum oxide its formula being $Al_2O_3 2H_2O$ which came from Little Rock, Arkansas. Beauxite until recently has not been found in the United States, but in 1887 a deposit was discovered in Floyd County, Georgia, which contains titanic acid and resembles the mineral found in Asia Minor. It varies in color from light salmon to dark red according to the admixture of iron sesquioxide. This beautiful specimen is from Georgia; it is also found in Alabama. It was first found in France near the town of Beaux, hence its name. Large deposits are found in other parts of France. It is also found in Austria at Freisstritz and Wochein in Styria where it is called Wocheinite. Deposits similar to those of France are found in Ireland at Irish Hill, Strait and Glenravel. Deposits are also found in Hadamar in Hesse, at Klein Steinheim Langsdorff and in French Guiana. Cryolite, aluminum sodium fluoride, was first found in Ivigstuk in Arksut-Fjord, West coast of Greenland, where it constitutes a large bed or vein in gneiss. It is a snow-white

semitransparent mineral when pure. It is fusible in the flame of a candle, and on treatment with sulphuric acid yields hydrofluoric acid. Its first use was by the soap-makers for its soda and is still used for making soda and alumina salts, and to make a white glass which is a very good imitation of porcelain. The specimen exhibited is from Greenland, its formula being $Al_2 N_6 6 NaF$. The only known deposit of cryolite in the United States is that found near Pike's Peak, Colorado where it occurs in small masses as a subordinate constituent in certain quartz and feldspar veins in a country rock of coarse reddish granite. Here is also a specimen of kaolin, white china clay, from Aiken, S. C., its formula being $Al_2O_3\ 2SiO_2\ 2H_2O$. This piece of corundum, aluminum oxide, is from Buncombe Co., N. C., its formula being Al_2O_3. The small specimen of gibbsite, a hydrated aluminum oxide is from near Seidersville, Lehigh Co., Pa., its formula being $Al_2O_3 3H_2O$. The beautiful piece of diaspore, also a hydrated aluminum oxide, is from Chester, Mass., its formula being $Al_2O_3H_2O$. Of these minerals, beauxite, cryolite and kaolin are the commonest. Corundum is valuable as an abrasive, while the other two, gibbsite and diaspore, are comparatively rare; if they should ever be discovered in a large amount they would be very valuable as aluminum ores.

In the reduction of aluminum many processes are in vogue. Deville succeeded in reducing it by electricity in 1854, as previously mentioned, but the expense was too great with the methods of generating the current at that time, therefore he adopted what is known as the process of reduction by potassium or sodium, which is still carried on with the latest improvements at Nanterre, in France. In the United States the electrolytic process is used by The Cowles Electric Smelting and Aluminum Company, of Lockport, N. Y., where a great water power drives their immense dynamo.

The Pittsburg Reduction Company, who have works at New Kensington, Westmoreland Co., Pa., and Niagara Falls, N. Y., also use the electrolytic process under the patents of Mr. Charles M. Hall. They manufacture a very pure metal, which is guaranteed ninety-nine per cent pure. The plate here exhibited is of their manufacture, the dentures were also swaged from some of the same metal. There are many other methods of reduction, but time will not be taken to name them, much less to describe a single one of those already mentioned. Ludwig Grabau, of Han-

over, Germany, a patentee of a process for the reduction of aluminum fluoride by sodium, the principal object of which has been to produce metal of a very high degree of purity, where every precaution is taken to procure pure material and prevent contamination during reduction, said in a paper written in 1889: "The purifying of impure aluminum is accompanied by so many difficulties that it appears almost impossible. It is, therefore, of the greatest importance to so conduct the operation that every impurity is excluded from the start. Molten aluminum compounds, whether a flux is added or not, attack any kind of refractory vessels and become siliceous if these vessels are made of chamosite or like materials, or if made of iron they become ferruginous. These impurities are reduced in the further processes and pass immediately into the aluminum as iron, silicon, etc. Evidently the case is altered if an aluminum compound, which is infusible, can be used advantageously. Aluminum fluoride is infusible and also retains its pulverized condition when heated up to the temperature needed for its use; it can, therefore, be heated in a vessel of any kind of refractory material or even in a metallic retort without danger of taking up any impurity."

Much of the commercial aluminum which dentists attempted to make plates from twenty-five years ago contained from two to three per cent of silicon and from five to eight per cent of iron, with traces of sodium, copper, lead and other impurities, which under the most favorable conditions resulted in disintegration. The iron in the metal oxidized in the fluids of the oral cavity leaving holes and fissures in the plate.

The cast plates of so-called aluminum are never made of even commercially pure metal on account of the shrinkage, which is $\frac{1}{64}$ of an inch to the foot, but are in fact aluminum alloys. One of the best known, that of Dr. C. C. Carroll*, contains:

Aluminum	90 to 93 parts.
Silver	5 to 9 "
Copper	1 "

This alloy when cast under slight atmospheric pressure, which may be obtained by a continuous current of air from a bulb-blower, gives perfect castings, is very white and easy to work. The addition of copper reduces to a minimum the shrinkage of the alloy, also giving it a closer grain. It is claimed that the introduc-

*U. S. Patent 373,221, Nov. 15, 1887.

tion of five per cent of silver benefits the metal—considerably increasing its hardness, capability of polish, making it whiter, denser and stronger. This small piece of plate and the ingots exhibited contain five per cent of silver, and were produced by the Cowles E. S. & A. Co., at Lockport, N. Y. It is much harder than pure aluminum, and not so malleable.

Cast alloys containing not more than 95 per cent of aluminum show a crystalline structure, break short, and with a tolerably level surface.

The commercial metal, which is probably 98 or 99 per cent pure, may be forged and rolled with as much perfection as gold or silver. Its fibrousness is greatly increased by hammering and rolling; it also becomes sensibly harder after being worked, probably owing to the closing of the grain; its density is also increased. Commercial aluminum may be readily tested with a knife; if quite pure it cuts smoothly, the shavings turning up similar to pure tin, yet 95 per cent metal can hardly be cut at all, the shavings break off short and a fine grating is felt through the blade. Pure aluminum stands third in malleability, being exceeded only by gold and silver. In induction it stands seventh, gold, silver, platinum, iron, very soft steel and copper coming before it. Sheets of the metal are rolled down to 0.0007 of an inch in thickness and beaten into leaf as thin as gold-leaf. Its electrical conductivity is about 55, taking that of silver at 100, but is practically nonmagnetic. Is easily and readily welded by the electric process of Prof. Thompson. The soldering process has proven more difficult, yet there are a number of solders used successfully. A very good solder is formed of 45 parts tin and 10 parts aluminum, applied with a common soldering iron, without flux or preparation of the pieces further than having the parts to be united filed or scratched to a clean, bright surface. Mr. Joseph Richards,* of Philadelphia, makes a good solder for use with the blowpipe or with the iron. The formula is unknown to me, but is similar to the one mentioned except it contains phosphorus for its own flux. Here are some samples of the solder. It has been in use in Europe for more than a year, and is pronounced by Dr. Kiliani, the metallurgical expert and chemist of Berlin, as the only successful solder yet discovered. It is the solder used in the manufacture of canteens and helmets and various accoutrements for the German army.

*U. S. Patent 478,238, July, 1892.

MANIPULATION FOR DENTAL PLATES.

In making swaged plates take the impression in plaster, making a perfect model in plaster, varnishing with sandarac varnish, which you can easily make by dissolving gum sandarac in alcohol in sufficient quantity to make a ready flowing varnish. Where there is much undercut it is best to make a few detachable pieces with plaster and asbestos, leaving the outside shaped in such a manner that it will readily withdraw from the sand, and the small pieces be replaced in the mold.

For molding use good molder's sand mixed with one-third marble dust, sifted clean and made quite moist with water, which is preferable to oil, as the mold is soon warmed and dried sufficiently over a gasoline or gas stove. For dies use zinc, as the shrinkage is an advantage in making certain compensations which are conducive to a closer adaptation of the plate. For the counterdies use lead, making two for each case. Before pouring the lead on the die, cover it over with whiting and water mixed to the consistency of cream, and warm it before pouring. Make a pattern in the usual way with tin or lead foil. Now take a piece of aluminum plate of sufficient size rolled to No. 19 B. and S. gauge, anneal it over a large alcohol flame, or Bunsen burner, cleanse the surface with sulphuric acid and boiling water, and immediately dip in a solution of bicarbonate of soda, and thoroughly wash with warm water and soap, using the brush. Dry, and run through the rollers, setting them close enough to bring it to No. 20; but just before rolling place on the plate a piece of fine ricenet with plenty of sizing, passing it through with the metal which gives the fine network surface noticed. People who wear the plates say the network surface feels more pleasant and adheres better than a smooth one, besides there is never any occasion for the depression known as an "air chamber."

In swaging use horn mallet and smooth pliers, always keeping a piece of thin tissue paper between the plate and die, also between the counterdie and plate. The tissue paper is a great protection in keeping the plate clean, as there is always danger of driving small particles of zinc or lead into the texture of the plate. It must be frequently annealed, being careful not to overheat, bearing in mind that the melting point of aluminum is about 1,150° F. If the plate is heated quite hot and dropped in cold

water it becomes very soft, but at the same time will lose its elasticity, which is undesirable; it should be left to cool gradually, as when worked thus it will be elastic like coin gold. A German firm engaged in making aluminum states that by long gradual cooling from a red heat, aluminum can be made so elastic that it can even be used for hair springs for watches. After it is well adjusted to the die, the rim for either upper or lower denture is turned with a pair of pliers with smooth surface on the bite, and beaten down with the mallet, driving it home in the second counterdie without any paper.

The plate is now tried in the mouth and trimmed where necessary to a perfect adaptation, a rim of softened wax placed on it and the bite taken. It is then placed on the articulator and the teeth

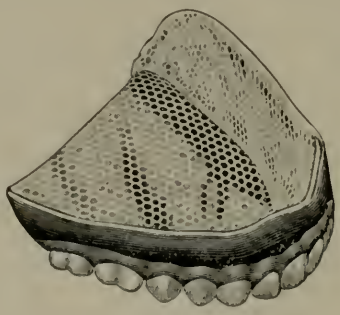


FIG. 1.
Full Upper Set. Gum Teeth.

set up, using either gum or plain according to the operator's choice, attaching the teeth with wax in the same manner as for rubber attachment for a gold plate. In order for a perfect articulation it is necessary to again try in the mouth. When the teeth are satisfactory, and properly placed, mark the plate with a sharp pointed instrument at the margins of the wax, and flask with plaster in a regular vulcanite flask.

Separate the flask after warming it, remove all the wax with spatula and boiling water, and also carefully remove the plate, cleansing it with boiling water. Next place the plate on the die, and supply some lubricant as turpentine and sweet oil, or stearic acid 1 part and turpentine 4 parts. Apply on the portion to be etched which is represented between the lines marked before the removal of the wax, this will prevent the tool from sliding and cause

it to cut as readily as into pure copper. The etching is made with chisel and hammer, an assistant striking while you hold the plate firmly on the die, and move the chisel as desired almost in the same manner as specified in the patent of Dr. A. Clark.* In his method no rim was turned and the etching was all the same, making rows turned in opposite directions. In my method the first row is made with a straight edge chisel about 3 millimeters wide, turning the handle of the chisel outward, this forms a line of etching that will effectually prevent the thin edge of rubber lifting from the plate; the remaining part is etched in rows around the plate, making each row by leaning the chisel in the opposite direction. A turning chisel with a bevel edge about 5 millimeters wide is suitable for this, being careful not to drive the point

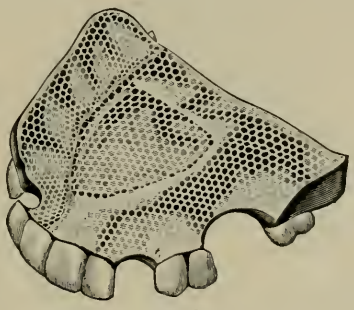


FIG. 2.
Partial Upper Set Plain Teeth.

through the plate. The rim is opened a little before etching so the rubber will pass under the turned over portion. After the etching is completed drive the margins up to the die with a piece of hard wood, as the etching process will cause a little spreading of the plate at some points. Now place the plate in a porcelain or china bowl and pour on it about half an ounce of full strength sulphuric acid, adding four times as much boiling water; in about a minute remove and plunge in strong solution of bicarbonate of soda, rinsing and brushing in clean water with a little soap. If not bright and clean repeat the process. When dry varnish all that portion not etched with a good coat of sandarac varnish. As soon as the varnish is hard replace the plate in the flask and pack the space around the teeth with pink or red rubber, in quantity sufficient,

*U. S. Patent 86,131, Jan. 26, 1869.

heat and close the flask and vulcanize one hour and thirty minutes at 320° F. or 85 lbs. steam gauge. The sandarac varnish protects the plate, keeping it bright and clean, and is readily removed afterward with a little alcohol. In polishing, the rubber attachment is filed and dressed with scrapers and polished in the usual way, being careful not to cut or scratch the metal portion of the plate. Aluminum will take and retain a very high polish, but the use of old means is not effective, as the bloodstone and burnishing iron tear the metal as fine stone does glass. In the absence of any special polish the ordinary cold brass polish will be found very efficient if ground fine enough. The Pittsburg Reduction Co. furnish an excellent polish consisting of stearic acid 1 part, Fuller's

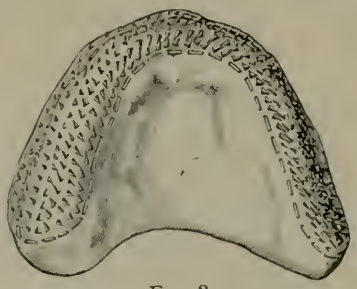


Fig. 3.
Full Upper Plate Etched Ready for Rubber Attachment.

earth 1 part, and rotten stone 6 parts, the whole ground very fine and well mixed. They give it the name "Almeta Polish." A sample of it is exhibited.

The best means of burnishing is to use on the lathe a piece of soft wood made in the shape of a cone, and soaked in olive oil; this closes the grain of the plate and gives a most brilliant polish. For full upper dentures there is no better material than aluminum, and for the small partial plates it is especially desirable, for lower sets where the ridge is much absorbed its lack of weight seems to require some stay. Have made one set with the Stedman springs which are very satisfactory. You will observe the method of placing them in the set exhibited, the spring posts hold both plates very firmly in place. Where there is a good alveolar ridge no stay or spring is required, the lower plate remaining in place without any mechanical device. For small sections held in place with broad clasps of aluminum, annealed in the manner mentioned in

order to retain sufficient elasticity, it offers very large possibilities, as these can be placed in the mouth at a moderate expense, frequently serving the purpose of expensive bridgework, although these clasp plates are not recommended, only in some exceptional cases. The clasps may be soldered to the plate, fastened with the rubber attachment, or fashioned from the plate itself like this sample. There has been a patent granted for taking the impression for such cases with the clasps on the teeth, similar to Dr. Noble's method mentioned in Harris' work, or some similar process, but all infringement is avoided by taking impression and making the small die with Babbitt metal or something similar, as no shrinkage is desirable here. The piece is swaged from plate No. 22 B. & S. gauge; the articulation, attachment, flasking, vulcanizing, and finishing all being the same as for full plates. For appliances in orthodontia aluminum is vastly preferable to any cheap metal yet

FIG. 4.
Removable Bridge, Right Lower.

offered in place of gold or platinum. Very erroneous statements with reference to the chemical properties of aluminum have often been published. Air, wet or dry, has no action on it. Water has no action either at ordinary temperature or at the boiling point, 212°. Aluminum leaf, however, will slowly decompose water at 100°. Sulphuretted hydrogen exercises no action, as may be proven by leaving the metal in an aqueous solution of the gas. Sulphuric acid diluted in the proportion most suitable for attacking metals which decompose water has no action; and contact with a foreign metal does not help, as with zinc, which fact tends to remove aluminum considerably from those metals. Concentrated sulphuric acid dissolves it rapidly with the aid of heat, disengaging sulphurous acid gas (SO_2). Nitric acid concentrated or weak does not act on it at ordinary temperature. In boiling nitric acid, solution takes place very slowly. Hydrochloric acid weak or concentrated dissolves the pure metal very slowly. Hydrochromic, hydriodic, and hydrofluoric are said to act very similarly to hydrochloric. Acetic acid, or a mixture of acetic acid and common salt in solution with water has a slight action which is almost inappre-

ciable if the metal is pure. Aqua ammonia acts very slowly, producing a little alumina. Strong alkaline solutions act with great energy on the metal, transforming it into aluminate of potash or soda. However, it is not attacked by caustic potash or soda in fusion. Tissier found that aluminum may be made to unite with mercury merely by the intervention of a solution of caustic potash or soda. If the surface of the metal be well cleaned or moistened with the alkaline solution it is immediately melted by the mercury and a shining amalgam forms on the surface. The aluminum in its amalgam is very easily acted upon and behaves like a metal of

FIG. 5.

FIG. 6.

Full Upper and Lower Sets, Plain Teeth, with Stedman Springs and Granulated Rubber.

the alkaline earths, which is interesting to aluminum amalgam advocates. Recent experiments by Prof. George Lunge, Ph. D., in which tests were made by immersing aluminum in coffee, tea, beer, wine, and many acid solutions, confirm the chemical properties first mentioned, with many others, proving that no metal to be worn in the mouth other than gold, is less acted upon by food, liquids or the secretions of the oral cavity. Due acknowledgment is made to Prof. Joseph W. Richards, of Lehigh University, Pa., for much valuable data in this paper. His work is the only one which presents a systematic treatise on aluminum, in the English language, and ought to be in every dentist's library.

The shorter name aluminum has been used as the one generally adopted by manufacturers and workers in the metal in this country, although aluminium is considered more euphonious by some of the best teachers and metallurgists.

For the men of talent and genius in the profession many other uses of this seminoble and easily wrought metal will be discovered, bearing in mind James Russell Lowell's famous lines: "The man of talent takes the existing moulds and makes its castings, better or worse, of richer or baser metal, according to knack or opportunity; but genius is always shaping new ones, and runs the man in them so there is always that human feel in its results which gives us a kindred thrill."

DISCUSSION.

Dr. GRAFTON MUNROE: I have listened with a great deal of interest to what I consider an elaborate paper on this very light subject. [Laughter.] I think the essayist has shown a degree of skill, of study, and research in preparing this paper that has only been appreciated by the way in which the members of the society have listened to it, and I congratulate him upon the whole paper except the title of it. He has gone into the details of the chemistry and natural history of the subject, and I think the title should have been "Aluminum, Its History, and Swaged Aluminum Plates." There is hardly any dentist who (if he was going to make a gold plate) would tell us about the history and chemical properties and all that pertained to the preparation of the gold, before he started to make the plate. The essayist has told us in a very interesting way about the history of aluminum, and in that regard it has been very profitable to us, but the practical part of the paper came at last, and I think the specimens he has shown us, and the earnestness with which he has presented the subject to us, have shown that there is more in aluminum than we might expect. I have used quite a great deal in my practice. I have taken rubber plates out of the mouths of patients in whose mouths there was a great deal of inflammation due undoubtedly to the coloring matter that we all know is in rubber, and have used aluminum, which is a good conductor, permitting of greater freedom of taste and sensations felt when cold or heat is taken into the mouth. There is greater pleasure in the use of this plate than a rubber one. By the use of pure metal and care in the manipulation of it, I have been satisfied with its use. I have encountered some objections on part of patients to its use, but after telling them of its properties and the lightness of it, they yield to the use of it.

The essayist has had more experience in the use of the metal than I have, and I hardly think I can add anything to his method of manipulation. I therefore yield the floor for further discussion.

Dr. A. W. Freeman: I have had very little experience with aluminum, and I do not rise to speak of it so much as to bring up one point in regard to the making of dies. The most of our students in some of our dental colleges were instructed a few years ago to make their dies largely of Babbitt metal. I have had the worst kind of experience in the use of that metal for full denture dies. Plates made four or five times and still do not fit; they are too large. There is just enough shrinkage in a large zinc die to make a good fit. Let us go back twenty years. The first plate I made after I came to Chicago I made on a zinc die. It was worn by a man through the army who afterward came to Chicago. I never made one to fit like that since. Another one was made before the Chicago fire, and one of our brothers made a duplicate of it, which is carried in a lady's trunk when she goes abroad, but it was made on a Babbitt metal die. I know some dentists in Chicago who are excellent plate workers, who will not touch one of these dies, and who have struck off plates for me that would fit, would not rock or tip from the mouth. I believe the air chamber has something to do with it.

In reference to aluminum, the only objection I see to the plates passed around is that they were not able to make sufficiently rounded edges, an important matter where it comes next to the buccal tissues, yet where the edges were turned they were good. The same thing holds good in regard to many rubber plates not more than half made, left with perfectly sharp edges, ready to cut the tissues and do detriment that cannot be repaired.

Dr. J. H. Woolley: We have listened with a great deal of pleasure to the essay on aluminum, and particularly to that which is historical. I know that many practitioners feel some degree of hesitancy in attempting to introduce this metal in their practice. Many of us know of the great number of failures from rubber when it was first introduced in this country. If they had not continued to study it, and learn its working capacity, a great boon to humanity might have been lost. It seems to me in regard to aluminum that this is a new field for investigation, and we should endeavor to find out how to develop its greatest worth. I would like to know how it is affected by the secretions of the

mouth. Two or three years ago in this society a discussion was brought out by Dr. Patrick in regard to the effect of the alkaline secretions of the mouth upon aluminum. He claimed that the fluids or secretions caused the plate to disintegrate. I would like to know something in regard to the wear of aluminum plates, whether the defects that have been found were caused by the secretions of the mouth, or by the process of swaging, which possibly left particles of the metal dies on the surface of aluminum and while the rubber was being vulcanized upon the plate a molecular change occurred. We should make haste slowly in testing this material and if it proves durable then we have something that can be recommended to our patients.

Dr. W. A. Stevens: I desire to say a few words on this subject, and first in regard to rubber plates. A few years ago I made the statement that there was nothing deleterious in them, which was followed by experiments by Dr. Black one to two years later proving the statement correct. So far as the action of the rubber or the coloring matter in the rubber is concerned, the whole trouble lies in uncleanliness. Rubber is not a good conductor of heat or cold. I think that is one of the great causes of absorption of the process in the mouths of those people who wear rubber plates. It is the heat caused by the rubber and not any ingredient in the rubber.

I have made a cast aluminum plate for lower cast for myself. I intended to have had it completed and wear it to-day and show it. But an accident befell the attaching of the teeth with rubber. I have tried rubber, continuous gum and all other kinds of metal for a lower case in my own mouth. While the aluminum cast plate is as thin as I could make it, it is the only plate that would stay down in my mouth. In the plate I now wear there are two ingots of Weston's metal, and it weighs no more than the horseshoe which Dr. Sitherwood has exhibited here, yet it does remain in place as well as the cast aluminum.

Dr. H. Reid Staley: I am not quite as much interested in the swaging of aluminum as I am in cast aluminum. I have made about fifteen or sixteen swage plates in my practice, and most of the trouble has been with the rubber parting from the aluminum. I have tried every way, taking the instrument for puncturing it and making it like a nutmeg grater, still I find it will separate from the plate. I have made some cast plates. About four years ago I

made the first one and the rubber has not separated in the least from the plate. Of course, we have an edge there. We can have a kind of dovetail to the rubber which retains it. The rubber is thicker at the edges and will not separate from the plate so easily. I can get a better fit with cast aluminum plates. I feel proud when the patient puts in the plate, and says he is well pleased with the fit.

Dr. SITHERWOOD (closing the discussion): I will not take up your time by a long reply as there has been really nothing said in the way of criticism. One of the gentlemen spoke about the rubber leaving the aluminum. There is no difficulty in that way if it is properly swaged in the manner I have shown here. I have made a good many plates, some of them having been worn eight or ten years. A plate made in 1879 I saw the other day, and it was as good as when I placed it in the mouth. I have made plates on various bases used for dentures. I have always had the same expressions from patients after wearing aluminum plates for a short time. They have never worn anything so satisfactory and which feels as pleasant as an aluminum plate.

I presented this paper to encourage you to go home and try what I recommend. I hope you will carefully read my paper after it is published and when making a denture attend to the details, especially with reference to keeping the plate clean. Have a clean surface. If you do not succeed the first time, try again. I replaced a rubber plate a year ago for a gentleman who could not wear rubber, and he wore the aluminum plate with a great deal of satisfaction.

I have not made cast plates because I desired the work pure. I have seen specimens with five per cent silver in them, and although I have made plates of that, I do not believe it will give the same satisfaction and have the same pleasant feeling in the mouth that pure aluminum has.

AMALGAM FILLINGS.

By Dr. T. W. Prichett, Whitehall, Ill.

We will introduce the subject of amalgam fillings by making our first clinic before the society. Will select two cavities and fill them. These will be typical of others of like form wherever found in the mouth. Our patient being in readiness, we invite him to a seat in our operating chair—and proceed first, to antisepticise our hands with soap and water. With our disinfected mouth glass, we begin our examination to find carious teeth. Yes, here is the first upper molar, with an extensive cavity in the mesial surface and extending upon the occlusal surface beyond the marginal ridge. Looking further, we find the second bicuspid decayed upon the occluso-distal surfaces in a similar manner.

With chisels and other suitable instruments, we will open up the cavities to view, and to facilitate the removal of the decay. The latter being done, several considerations are to be borne in mind at this stage of the case, viz.: Anchorage for the retention of the fillings, extending the cavity margins with reference to anticipating future decay, the restoration of proximate contact, and the preservation of the interproximate space by a proper shaping of the cavities to conform to these several requirements.

Having the cavities prepared, the salient features as to anchorage consisting of a broad cervical base and a pit or step in the central fossa, with or without retentive shape of the side walls, we are ready to fill.

The rubber dam will now, if not before, be placed in the usual way, and the cavities dried and sterilized.

As it is difficult to fill and finish two proximating cavities at one sitting, we will fill the bicuspid cavity temporarily with gutta-percha, and to serve also as a brace for the matrix while filling the molar cavity with amalgam. A thin piece of copper has my preference for a matrix, because of its flexibility and its adaptability to the necessities of contour and easy removal. It should be long enough to reach around upon the buccal and lingual surfaces about half way.

We will place our matrix in position and secure it by packing the proximate space with warmed Gilbert's stopping, extending it around bucco-lingually in sufficient quantity to cover in the ends of the matrix. If a clamp or separator is used, pack plenty of the stopping upon it to hold the matrix more securely.

We will now prepare the alloy. This I do by kneading in the bare hand with a finger of the other hand. The first guess at proportions of alloy and mercury should show an excess of mercury. We will add of the alloy until the proper working consistency is attained. This may vary a little, according to the form of the cavity to be filled. For contour—more mercury. For a simple or four-walled cavity—less.

In all cases, malleting should bring to the surface a visible amount of mercury. We will place a small pellet of the mixture in the cavity, and with a slightly oval, smooth faced instrument adapt it to the cervical wall by direct and rotary pressure; working it out from the central mass to the side walls of the cavity. This first pellet, and all others that come in contact with the walls, should be worked down thin, so that the purer alloy may be forced into the closest possible relation to these surfaces. Other pellets will be added and condensed with hand pressure, using instruments of as large face as the cavity will permit. When about one-fourth full will introduce a pad of fine bibulous paper and upon this place the plugger point and begin the malleting. The face of the instrument should be directed toward the buccal and lingual, as well as the cervical walls, to insure greater uniform density of the mass.

The general shape of the filling at this stage should be concave. The surplus mercury may be wiped away with bibulous pads, and the filling carried to completion with or without the intervening pads, using the mallet to the last. The cavity should be filled overfull about all the margins, to permit of trimming the filling to proper form, and the removal of the less dense outer surface. We will now remove the stopping, straighten out the ends of the matrix and gently tilt it back and forth until it will detach without injury to the surface of the filling.

Will trim and shape the filling approximately to the form desired, and make the final finish at a subsequent sitting. When the patient returns the first filling is completed. We wish to maintain

the full width of the interproximate space, or perhaps to increase the width slightly, in consequence of closure for want of contact.

After replacing the rubber dam, will adjust a separator, and press the teeth apart a distance equal to the thickness of the matrix used, plus some allowance for finishing the proximate surface of the filling. Will adjust the matrix as before, and proceed with the filling as in the molar. In removing the matrix in this instance, it may be facilitated by a turn of the separator screws. Will now finish the filling as near to the desired form as possible, and remove the separator. The proximate surfaces of the fillings should come into immediate contact, and with a *free* interproximate space —the *ideal* form for comfort and safety. After hardening, any excess about the margins of the filling may be removed with finishing files and other suitable instruments. The method of procedure here described, may, as a general rule, be applied to occluso-proximate cavities of the bicuspids and molars of both jaws.

The intended purpose of the foregoing is to demonstrate that the acknowledged best forms to be given to fillings, can be made with amalgam, and by comparatively simple and easy methods.

All of us have observed that cavities with weak walls, having little or no supporting dentine, are liable to fracture under the force of mastication long before leakage could induce recurrence of decay. This danger may be reduced to the minimum by shortening the weaker wall, as in the case of a crown cavity in a molar, extending near to the junction of another surface. Very liberal grinding down may be indulged in, and instead of great strain against a weak, long wall, we will have a short wall as a base to resist the crushing strain exerted upon the filling.

The buccal and lingual angles of the cusps, when frail, may be cut away and strengthened upon the same principle—adequate anchorage of course to be secured in the most available portions of of the tooth, according to the circumstances.

Good preparation of cavities is just as essential to success with amalgam, as with any other material. The ideal cavity form for amalgam would be box-like, with slight divergence toward the axial wall, for retention.

Too much anchorage—or *undercut* may be as faulty as too little, tending to leakage and liability to fracture of the walls. Such cavities may sometimes be changed from irregular to simple form, by lining them with cement, and finishing with alloy.

We will now consider some of the situations when and where amalgam may be used with propriety. First, and broadly stated, in any and all the teeth, temporary and permanent—wherever you do not *wish* to use anything else. Second, in any and all cases where you *cannot* use anything else. Third, in bicuspids and molars, more frequently than in incisors and cuspids.

The first and second classification refers in the main, to teeth of inferior organization, large and irregular cavities, anything involving doubt of reasonable permanency, if any other material be used. This will include the filling of the incisor teeth of young persons *tentatively* with amalgam, if by so doing the form of the interproximate space would be better maintained—the fuller development of the process following as a necessary sequence. Subsequently when more favorable conditions supervene, such fillings may be removed and replaced with gold with greatly increased expectancy.

The third classification is a field less limited in choice of materials—bicuspids and molars, than any other, and it is here that amalgam has shown its highest capability for good. It is here also that its greatest failures have occurred—as when all reasonable conditions are absent, neither it nor any other material will save teeth for a great length of time.

I will name a few considerations governing the choice of amalgam for filling bicuspids and molars, viz.: (a) The choice of the patient; (b) the choice of the operator with the consent of the patient; (c) the ability of the operator to make good gold fillings; (d) the ability of the operator to make good fillings of amalgam; (e) when a good filling can be made with amalgam, and not with gold, then there should be but one choice; (f) when either would be doubtful and nothing else would promise better—well! I do not know.

All substances used for filling teeth have some faults, and no *one* of them can be used to meet all conditions and situations. Perhaps the greatest objection to amalgam is that of color--particularly so, when exposed to view.

All metals are open to some objection on the same score, with amalgam in the lead, as it does not even have the merit of constancy, in always turning black. Even if it always should turn black, that objection alone may not always stand, for who knows but that some day the arbiter of fashion may decree that it is the

proper thing, and the yellow king may have to abdicate in favor of his darker rival.

The old controversy as to whether amalgam shrinks or expands in hardening, has not I believe, been authoritatively settled. However this may be, it is patent to every one's observation, that leaky margins more frequently occur in fillings of amalgam than of any other.

I have commenced some experiments in lining cavities in glass tubes, and in teeth both in and out of the mouth, with several thicknesses of gold foil, and finishing with amalgam. Also intermingling pellets of gold through the mass of amalgam, with the hope of counteracting, in a degree, the tendency to leaky margins. The time has been too short, and the experiments too few, to predicate an opinion, whether anything will be gained by such methods or not. If nothing can be added to the physical character of this material to improve its faults, then we must go back to, and improve our manipulation, if we would exhibit better average results than have heretofore obtained. This I have little doubt the most of us can do, by the better preparation of cavities and better adaptation of the material in the cavities.

Having referred to some of the objectionable qualities of amalgam, it will not be unfair to say something of its good qualities. It is sufficiently hard to resist wear against the most vigorous mastication. It possesses "preëminent" working qualities, in most situations, being remarkably cohesive. It is easily condensed, and its wide range of adaptability to all forms of cavities is not surpassed by any of the metals now in use.

Nearly every practitioner must have need of some intermediate material that will enable him to meet a great variety of conditions and wants of his patients—not the least of which is their purse. Many persons who need and ask for our services cannot reward us for gold fillings, so we must have something as a compromise with which to extend useful service to the largest number. What else can you name that will serve this purpose so well as amalgam?

To summarize and close this theme, I commend to you the *three graces*—anchorage, density and form.

DISCUSSION.

Dr. E. D. Swain: I find myself in the same predicament as those gentlemen who left their essays at the hotel. My ideas and preparation, what little I have made for the opening of this discussion, are also at the hotel. It is pretty well acknowledged to day, as the paper has stated, that the dental profession needs some material, other than gold, and while I do not desire to be recognized as a special champion of amalgam, I must say I know nothing else that will fully take its place, for the reasons given by the essayist. It is hard and strong enough to resist the action of mastication, and in some of the amalgams I have been led to believe that there were prophylactic properties which perhaps prevent decay and save teeth when other materials would fail. The number of amalgams I really have not had time to learn, but I should presume that there are a hundred different alloys upon the market. The theory is well developed in the dental profession that among this number of amalgams we should be able to select one for each individual case for which it is best adapted. This is a point of perfection that I have not reached, and therefore I use in my practice generally not more than three or four. I have at the hotel some experiments that I have made, and I presume it is well for you that they are there, because I do not think they were a decided success. But as the essayist has stated, and I believe myself, there is a place in our profession for amalgam.

We have heard in this society the assertion made, that where a tooth could not be filled with gold, it should not be filled at all. Before the day of gold and other crowns, we heard it said that such teeth should be extracted. We have heard men in the profession say that rather than fill the teeth with amalgam under any conditions whatever, they would extract them. Of course, we all realize that since the days of the Richmond, porcelain and other crowns, that that extreme can now be much better avoided, and less amalgam may be used. But it is my belief that it is the province of the dentist to save everything that can be saved even though he uses amalgam to do it.

I believe that one of the great causes for the failure of amalgam has been in the lack of preparation of cavities—carelessness. It has been recognized as a cheap filling material; that very little money was coming in from its use and consequently the cavity for such a filling was often prepared in a hurry, and sometimes I have

almost thought that the material was introduced with the thumb and finger, so very slovenly was the material put into the cavity, so poorly prepared. These things all point to failures. Gold would fail under similar conditions, and the same holds true with reference to cement. Amalgam has had to carry all of these years the odium which came from lax operations of this character, because enough time was not given to the preparation of the cavities, when as a fact the amalgam itself was not entirely to blame. When a filling has been made with amalgam many operators neglect to completely finish the work. I understand that many of the dentists practicing in the country and using the older amalgams—those we have been compelled to use in years back—could not very well be finished on day in which they were put in. Their patients came from a distance, and consequently it was difficult for them to come back to the office unless they did so very soon after the work was done, and the result was that the ragged edges, the overhanging mass of amalgam at the cervical wall was not polished down to a plane with the cavity margin, frequently has had a tendency to work against the use of the material itself. This finishing I consider quite as essential, perhaps a little more so than a perfect finish of a gold filling. If we would do good and conscientious work, if we would use our best endeavors to make that work as perfect as possible when it leaves our hands, all of our work in amalgam fillings would prove more valuable.

A few days ago I was speaking to Dr. Cushing about some experiments that had been made with amalgam by Dr. E. K. Wedelstaedt, of St. Paul. I presume some of you are acquainted with him. He has been conducting experiments for a considerable time with various kinds of amalgam, and with some remarkable results. After learning this, I at once wrote to him, and he kindly sent me a four-paged letter, detailing in a measure his experiments and their results. These are at the hotel, and also some of the experiments which I have made in the same direction, with his consent.

I believe he speaks of visiting Dr. Black, and I think Dr. Black knows something about these experiments. I will give you his method as well as I can. He secures a wornout ivory ball, which he saws into slabs three-eighths of an inch thick, in which he makes a cavity with engine burs upon one side half way or more through the piece of ivory, when the cavity is prepared with

much smaller instruments. He drills a hole in the bottom of the cavity through to the back side of the ivory, then turns it over, and with a bur makes a cup into which the staining material is put, the idea being that a staining fluid would penetrate the small opening at the bottom, and if there had been shrinkage in the filling it would stain through.

The principal point of interest in his experiments is this, that he claims generally, greatly to my surprise, that cavities prepared in the usual way with the margins beveled and filled carefully, are the ones that do not leak. In almost every case cavities to be filled with amalgam are left with plain, strong walls. My recollection is that of twenty-seven experiments which he made, eleven, so far as he could determine, were very marked failures in using different kinds of amalgam. In each case (I forgot to state), he makes two cavities for the same amalgam and of the same mixture, one with straight sides, not beveled, and the other with the margins beveled, and I believe in one instance only—in one block in which he had quite a number of fillings—did the beveled cavity leak, while in nearly every instance the others did leak.

Dr. Noyes: How deep were the cavities in relation to the diameter?

Dr. Swain: I did not see his block, but those I have made are about as deep as they are square. They want to be pretty nearly a cube. The round ones are about as deep as they are large in diameter. I have tried to do that, not by actual measurement, but as near as I could judge by the eye.

There has been a theory in the dental profession ever since I have been acquainted with it that the dentist should be able in all cases to say to his patients what should be used in the way of material. The essayist has departed from that. He leaves it in some instances to the choice of the patient as to whether they shall have amalgam or gold inserted as a filling. I must acknowledge that for thirty years I have been compelled to do that very largely, and whether it was owing to my lack of judgment in these matters or my ability to convince the patient that I knew it all and that they had nothing to say in the matter whatever, I will leave you to judge. I do not pretend to say that I have always been compelled to ask the choice of my patient, but I let them decide very frequently whether a tooth shall be filled with gold or amalgam. I often try to convince that gold would be bet-

ter in certain cases, but I do not always succeed, so I have been obliged to give them their own way in making the selection in this matter very frequently.

I am very glad my friend Col. Koch is here to-day, as I am going to rob him of a little gratification which I suppose he would have if I assumed I got what I am going to say now, "out of my own head." The Colonel and another neighbor were spending an evening at my house not long ago, and I will say that the other neighbor is an electrician, a gentleman who stands second, if not the equal of Edison. My impression is that he is a man of better knowledge and more modesty; that he has never been in the hands of a syndicate, consequently he has not been advertised to the extent that Mr. Edison has, although I am a great admirer of Edison. He is a great man. The matter came up somehow and we got to talking shop, and the question of electric action between gold and amalgam fillings was broached. I suppose Dr. Koch and myself were really pumping him to see if we could not learn something. He made some suggestions that cleared up some things in regard to this question. He said at once that there is an electric or galvanic action between two fillings of different materials when one stands in the proximal surface of one tooth, and the other opposite a little way apart. He says the moisture in the tubuli is a good conductor. The current with the two teeth would be down through the tooth, through the soft tissues and into the other tooth, then the space being filled between the two fillings with a slightly acidulated secretion would go from one filling to the other, consequently there would be a circuit between these two teeth through the soft tissues below, and between the fillings above, and the result would be, as is always the case in electroplating, that from one pole of the battery the metal would be broken down, torn away. That would be universally the better metal, and the same condition would exist if both teeth had been filled with gold, one with gold that was alloyed, and the other was not. The same condition would exist between two kinds of amalgam used in opposite teeth, one poorer than the other, and especially if part of the alloy was zinc. Then he told us that this whole thing could be obviated if it were desirable, namely, by boring a hole in each of the fillings and passing a wire from one to the other. This would stop the entire action. You have then just what we all have when we repair a gold filling with amalgam around its cervical, buccal or lingual sur-

face where decay has taken place. When you repair it with amalgam you have got the two metals in close contact. You have destroyed the current. This was a new idea to me, and I give it to you as coming from Mr. Scribner.

I do not know that I have any further suggestions or remarks to make, as there are several gentlemen present who are familiar with the experiments I have spoken of, I will give them an opportunity to speak.

Dr. W. T. Magill: I would suggest that the point of uniting two fillings together with wire is hardly tenable. The stronger filling would be very apt to break down the filling in the other tooth in the oscillation of mastication.

Dr. Swain: That was not thrown in as a practical suggestion. It is very well known by all operators that the fillings would soon become loosened, and especially in bicuspid and molar teeth.

Dr. C. R. E. Koch: The gentleman referred to was very particular to inquire into conditions; the condition of the tooth when filled. Whether it was absolutely a dry substance or whether there was a physiological or anatomical moisture there, and he simply laid stress on the fact that electrolysis would start, not from the acid fluids between the two metals of different potency, but the current would start from the vital fluid which underlies the baser metal, and therefore would disintegrate it similar to the zinc of a battery, which, of course, would then make an opening for the action of the bacteria to destroy the contiguous tooth structure.

Dr. Black: The disintegration occurs at the margins where the fluids come in contact, or at the points of contact between the filling and vital tooth structure.

Dr. Koch: The question arose as to a remedy. Dr. Swain has stated one remedy. He said that if the tooth was absolutely dry, if there were no vital fluid there, we would have no such condition; and to create a condition of dryness, was necessary as a preventive. If you can insert a coating of some indestructible substance between the filling and the tooth surface you will very largely diminish the potency of the electric current, if not destroy it altogether. The suggestion was made of making a lining of gutta-percha—Mr. Scribner seemed to think that it would be a good insulator.

Speaking about the wire connection recalls to my mind an operation I saw, said to have been of Dr. Daboll's, which was an artificial incisor, anchored to a gold axis in proximal cavities of two

adjoining teeth. One end was imbedded in a gold filling, and the other in an amalgam filling. The bar evidently broke up the electric current, and the case was found four or five years afterward without a particle of disintegration of the tooth filling, and the artificial tooth secure and firm.

The idea of electrolysis and its force in tooth disintegration is of course not new. We have speculated on it for a great many years in this society as well as in other bodies; but I think the statement drawn from our neighbor comes more closely to giving a practical demonstration and practical reasoning than we ever had before. To some one who is versed in electric science it would make an excellent starting point, enabling him perhaps to absolutely prove this matter. I believe this is one of the demonstrable facts. The statement of our friend Scribner certainly deserves credit because of his ability and knowledge in this line.

Dr. Cormany: Would the effect be different if a tooth were pulpless?

Dr. Koch: I infer it would, because you would have a pretty nearly dry tooth, especially after you line it and stop all vital fluids from contact with filling material. Do you remember (addressing Dr. Swain) whether Mr. Scribner referred to that?

Dr. Swain: That question came up and my recollection is from the conversation that a decision was reached that there would be a fluid, though not a vital fluid; so long as it remained in the jaw there would be fluid, that is the moisture in the dentine.

Dr. G. V. Black: We have heard *pro* and *con* of this theory of electrolysis for a good many years, and it has been a good many years since I settled upon a conviction on this subject, which I must say very nearly fits in with what has been said to-day. My observation has been, that it cuts but a very small figure in this matter of amalgam and gold fillings because there is another principle that comes in almost as soon as the fillings are made, which counteracts this action, and that is oxidization of the surface of the amalgam filling. An amalgam filling, the surface of which is fairly well oxidized, is a complete bar to electrolysis, so that the whole matter falls to the ground. So long as a clean surface of the metal is exposed to the action of fluids we will get this electrolysis; but when the surface of the filling becomes blackened, so that the metal itself is not exposed to the action of the fluids, then the electrolysis must cease. The same will be true also in the electro-

lysis that may be formed by the action of the fluids *in a tooth* upon metal, and that has been the secret of the safeguard that is thrown around amalgam fillings that have blackened the teeth so completely. The action of electrolysis, or some other action, in many of these cases has caused disintegration of the metal next to the walls of the cavity until there is no longer any metal exposed to the action of these fluids, and the action ceases. Then gradually the coloring matter formed upon the filling is carried more and more into the tooth and it is deeply stained, but the tooth is not decayed. When we throw this feature of the matter along with the principles that have been announced we find we are in much less danger from electrolysis than we would suppose.

As to the first action. Suppose the filling remains bright. Well, if the filling remains bright, contact is necessary to prevent electrolysis. It seems to me, at the present day we are hardly excusable under ordinary circumstances in making fillings that do not make proximate contact, and if this proximate contact is made it stands as a safeguard against electrolysis in case the filling remains bright, but I may say, if electrolysis occurs, the filling is not apt to remain bright.

Before I return to Dr. Pritchett's paper, I will first say a few words regarding the experiments of Dr. Wedelstaedt to which reference has been made. I have had a good deal of talk with him at various times. His experiments have opened up a field of thought that promises great value, as I take it. He spent quite a little time with me in matters of study, and he is developing quite a good deal of energy.

This shaping of cavities, as his experiments seem to point out, shows that the mere form of the cavity is important as to leakage, and this holds just as true for a gold filling as for an amalgam filling. I believe there is a principle involved that will be developed in the future and in which we will find very much to encourage us in filling teeth; in other words, it is difficult to fill with any material a cavity that is in the shape which you see represented on the blackboard so that it will not leak. If they are in this shape (illustrating) we have a better chance. That is the point. The experiments of Dr. Wedelstaedt were undertaken, I may say, after a very long and careful discussion of the forms of cavities with reference to the making of water-tight fillings. Dr. Wedelstaedt is completely surprised with his experiments, and I think the work will be of importance to us in the future.

Where should we use amalgam? Should the patient make the choice? I should say no; and yet patients sometimes have a mind of their own. But by judicious management much of this can be controlled, and much of it cannot, perhaps. But the operator should have due regard to the infliction of financial injury upon the patient, and if the patient finds that the operator exercises care in this matter, it will strengthen the operator's hold upon the patient very materially. Consult with your patients about this matter of cost, remembering that a dollar is of very much greater value to some persons than it is to others, and we will have very little trouble, I think, on this score. We find by consultation that it becomes our duty to make amalgam fillings for some patients, while with others, under similar conditions, we should make gold fillings. Often it becomes a matter of duty on our part to save patients expense as far as we can. Here is a girl who is making her living by teaching or some other vocation, and money is very valuable to her. The saving of a few dollars in the filling of her teeth she appreciates, and values your services, and it is an important consideration. This is one of the places and one way in which we may determine the use of amalgam. But in such places, remember, all of you younger men particularly—I may say the older ones too—that while you are giving a cheaper filling material you should not be giving any less careful service. (Applause.) Indeed, I may say that the average of my amalgam fillings consumes as much time and care as my gold fillings. There is the same preparation of cavities and the same care in the formation of contour as in gold filling. The patient must be dismissed, must return the next day, or within a very few days, and then the same care is exercised in the final forming, finishing and polishing of the filling. So by the time we are through the amount of time is almost as great as if a gold filling was made.

There is another place where we can use amalgam fillings effectively and where they should be used, and that is where we have cavities so large that there is danger to the peridental membrane from the amount of malleting necessary to make a good gold filling. We can use amalgam in these cases with advantage. We had better use amalgam than to run the risk of ruining a tooth by injuring the peridental membrane. I have injured teeth in that way. I have had some absorption of roots that I could attribute to nothing else I still build pretty large gold fillings, and we can do so safely.

There is another point with reference to the use of amalgam that I will speak of, that is, in those cases where we desire to put crowns on roots that are decayed badly, scooped out considerably or are very short. We may use amalgam there effectively in lengthening the root. In some of those cases where there is a portion of the root yet remaining, sufficient to place a band upon, we may excavate the root carefully, extend the root with amalgam to increase its holding power for a gold shell, either for a bridge or crown. In cases still worse, we may make a band of very thin platinum plate and fit to the root nicely and fill inside the band with amalgam and make it very firm. A gold shell is then put on over the platinum band in the same way as over a good root. In teeth that otherwise would be of no use whatever, this can be very well accomplished. I think we can make these teeth stronger by this method than by any other. For a number of years I have been using a band of thin platinum filled with amalgam in this way in a good many instances where it would be impossible, so far as I could see, to construct a crown in any other way with any hope of its standing. Thus far I have not had a failure. But they will come soon enough perhaps. In such work we must take chances. The dentist should take chances. He is not doing his duty if he does not take chances. Here, for example, comes a gentleman fifty years of age with a lateral incisor decayed, the root badly perforated along the pulp canal, and the crown has toppled off. One patient came to me a short time ago with a very bad root upon which he had worn a Logan crown. By means of a thin platinum band, working it down about the root, fitting it, getting the amalgam packed firmly into it, I succeeded in forming a firm hold for a crown that will serve him for a number of years. I took chances I will admit, but when that crown is gone he will have a better chance for bridging than he would have to-day, and whatever benefit he has from the use of the crown is that much gain. The expectation should be explained to the patient in either crown work or bridging. Expectancy, in these cases, is a good term. It should be discussed with the patient in all of these cases.

Dry and sterilize cavities before filling. With reference to this I will say I do not want to dry the cavity before I fill it, and before I finish excavating it. I do not want to sterilize the cavity, with all due deference to Dr. Pritchett and any one else who does it. In the first place, I do not want to dry the cavity before I fill

it, because part of my excavating is done with the cavity dry. If I do some of it while the cavity is moist, when I finish excavating, the cavity is dry. I want to put the material against the walls of the cavity in exactly the condition they were left by my instrument. No moisture, nothing to come in contact with them after I have trimmed them, nothing to sterilize it or anything of the kind. I want to cut until I have got strong healthy tissue, and when I have done cutting I put the filling material against the healthy tissue just as I cut it. I believe it is the best way to do. We cannot sterilize the cavity with anything whatever and have the walls afterward in as good condition to receive the filling as before. A tooth has a good deal of water in it, and we cannot remove much of it by any form of drying. If we do, we run great risk of serious injury to the tooth, for as a matter of experiment I find I cannot half dry teeth without danger of cracking them. There is no danger in drying them with cotton. Since some experiments I have recently made, I am compelled to feel that there is danger in drying teeth by heat.

The Perry separators serve well to fix a matrix, and the matrix used by Dr. Pritchett is a most excellent one. Make it thin. I prefer brass, which is a little stiffer, annealing it at the time of using it. Having my rolling mill always at hand, I make it as thin as I want it. Before you screw up the separator slip in the matrix in the position you desire, so that the points of your separator will grasp it, then go ahead and separate your teeth. Your separator holds the matrix. Then you may fill and contour as you please. When you are through loosen your separator, lift it off, turn out the free ends of your matrix, slip the separator on again with the matrix between the jaws. Lift the teeth apart just enough so that your matrix is loosened. Lift it out. In this way you can contour with amalgam perfectly, and with little trouble.

Dr. Woolley: In connection with the subject under discussion, an interesting case came under my own observation. A second superior molar was crowned with gold, and a large alloy filling placed in a wisdom tooth adjoining.

Electrical shocks occurred whenever the patient passed his tongue, alternately, over the teeth referred to above. Relief came when a gold filling was inserted in the center of the alloy filling. Now the question arises, how were these electrical relations established?

Dr. A. E. Matteson: What I was going to say has been said in a better manner by Dr. Black and Dr. Swain. If there is one point that I would like to emphasize more than any other it is the proper preparation of cavities and the thorough finishing of the fillings. Dr. Black has dwelt fully upon that phase of the subject. The great difficulty in the use of amalgam lies in faulty manipulation rather than in the chemical or electrical effect of the filling.

With reference to a matrix, these can be made of thin steel (No. 40.) so as to conform to the proximal surface of the tooth which you are filling, and kept at hand ready to insert any time you wish, and should be left in until the filling gets hard. Some of the failures after the fillings are put in take place owing to the fact that the margins of the cavity are displaced at the time the matrix is removed, before the amalgam becomes fully hardened. It is just as necessary to have an amalgam filling in a perfect contour and finish as a gold one. If you have an amalgam filling where the margins have not been trimmed off, it leaves a place for food to lodge and there is failure—the most dangerous of any in the mouth—at the cervical margin. If it is necessary to put in two fillings, as spoken of by the essayist, you can just as well put in two matrices as one. The space between can be filled with soft solder, and it takes only a minute's time. If the cavity is on the mesial or distal surface where there is no proximal tooth, solder on each end of the matrix a piece of soft iron wire. Twist it around the tooth, allowing it to remain for a day or two until the filling is fully hardened, and there is little danger of dislodging it by mastication and occlusion of the antagonizing jaw.

Dr. Ira B. Crissman: In regard to Dr. Matteson's plan of making and using a matrix, I think this method might be facilitated by making a matrix of tin or of sheet steel, drawing the temper, making it very soft, bend it upon itself, cut off the corners, and introduce it between the proximal surfaces of the teeth. Bend the matrix over against the tooth, and as the tooth is rounded on its buccal and lingual space the angle should be, say 45° so that the lower portion will embrace the tooth at the gingival portion; it can be allowed to remain long enough for the setting of the amalgam before removal.

There is one thing in particular that I think more stress might be laid upon, and that is with reference to the union of gold and

amalgam in one tooth. In the case related, of filling two cavities —one in a bicuspid and the other in a molar—that would be objectionable on account of the galvanic action of the two metals, there being a simple battery. Let us take, for example, two similar cases where the cavity has extended down under the free margin of the gum (the gingival margin), it is impossible to place gold there. You can excavate at that place by dissecting the gum back and by packing cotton into the space, keep the cavity dry and build the amalgam filling over the gum margin far enough to protect it from the gum, allowing you to excavate into the amalgam after it has crystallized, making an undercut, and a good filling in the amalgam plug. If we take more interest in this matter, I believe in these cases we can assist our patients a great deal in having gold instead of amalgam fillings where color is objectionable.

The essayist spoke of placing amalgam into the anterior teeth of children. In my judgment that is poor policy. In the first place, the experience I have had with children's teeth convinces me that it is impossible to keep the cavities dry, or to keep the child quiet long enough to excavate the cavities properly. If amalgam is introduced into such a cavity when decay is present, and we find a recurrence of decay under the operation with amalgam, what is the cause of the destruction? If the cavity was properly excavated, wiped out with some good antiseptic—for instance, one of the essential oils—it would be a solvent of gutta-percha, or if you introduce cement into such a cavity it would be a good deal better for the patient than if you introduce amalgam, even if cement were replaced afterward on account of wear. That is one particular thing that we as operators fail, in a measure, to look into. We do not care enough for the small patients that come to us. Care should be given them; their visits are too far apart, have them call at least every few months if nothing else than to get acquainted.

Another interesting point was referred to by the essayist, namely, the patient dictating in some respects to the operator as to what he shall do, what filling material he shall use, etc. Of course, it is impossible for an operator to dictate entirely to his patients what they shall have their teeth filled with, and I claim also that it is utterly impossible for patients themselves to dictate to operators what they shall use. In the first place, the patient

can only dictate from a financial standpoint. If a patient says that he wants a certain tooth filled with amalgam, we will urge him out of it, telling him that it oxidizes, etc.; that he must have gold in this cavity on account of its superiority, and therefore we insert gold. A patient cannot always tell the conditions present in teeth, consequently if a filling is inserted in accordance with his wishes, then he must suffer the consequence if failure follows. The best plan to adopt is to diagnose your case according to your best convictions, then have the patient submit.

Dr. Edmund Noyes: A single word on this question as to who shall dictate. It is true that a professional man is expected to know more about his business than his patient does. It is true, also, that a great many patients have a deal of good sense and sound judgment, and many of them have observed and thought about their own personal characteristics, experiences and conditions, during an extended period of time. Now, there is no man in the profession of dentistry or medicine who is smart enough—unless he is a quack—to sit down, look at the patient a few minutes, and know absolutely all about him. And usually it is a task of sufficient difficulty for the professional man with all the aid his patient can give him, to ascertain what is best to be done. The whole range of circumstances and a mutual explanation of all the things that relate to the case as they appear from the standpoint of each one may go to make a final judgment, and I would not give a cent for a professional man if he cannot have the patient agree with him at the end of the consultation. It is absolutely necessary for us to convince them. To say to a patient at the beginning of the consultation that if he does not have his work done this way he will not have it done at all, will not work in the practice of dentistry very successfully. This is a matter that requires common sense, good judgment, tact and management.

I am tempted to say a few words now with reference to amalgam. I wish we knew what they were made of. We do some of them, and probably it is not a matter of great importance. But I do wish we knew in a scientific way something about the relative characteristics of different alloys made upon different plans, and something about the qualities which different ingredients give to the different alloys, and whether there is anything like a regular or consistent relation in these matters, or whether the mixing of silver and tin in one proportion may give certain definite results and

a slight variation in the proportions may give unexpected and entirely unforeseen changes in the product, etc.

Another thing, I should like to know is, the best way to use amalgam. We have been told that amalgams should never be washed, and we have been told that the oxide produced in the mixing of the amalgam should always be removed by washing. So far as I can judge equally good men contend for very different lines of practice and claim equally good results. (Perhaps, however, that relates to the different alloys rather than the main question as a whole.) Some men claim that the mercury and the amalgam alloy should be carefully mixed in accurate proportions by weight. I am under the impression that is desirable with some alloys, while with others it is not of any consequence. Some claim positively that in mixing amalgam there should be an excess of the alloy first, and the mercury should be added little by little; while others claim with equal positiveness that if there be any excess it should be of mercury first, and to complete the proportions the alloy should be added. I find some men are in the habit of mixing certain alloys till they are quite plastic and sqeeze them in their thumb and finger; other men advise taking the same alloy and mixing it till it is perfectly smooth and very plastic, and then squeeze it with strong pliers through chamois skin or linen, getting out all the mercury they can. I do not know which yields the best results, and I have never heard any statements that amount to anything like a scientific demonstration of these points that I remember. I am ready to be corrected if I am wrong, perhaps I am. But the whole subject of amalgam needs more definite knowledge, so that there can be some common agreement. It is a little like what Dr. Harlan once said about root fillings, it is desirable, if it is not time that the profession came to some general agreement in regard to this subject of amalgam fillings.

Dr. W. A. Stevens: In reference to the subject under discussion, in the first place, I do not see how the system by which Dr. Black and others put in matrices with the Perry separator can be a success. I like my own arrangement better; I use Taggert's tin and band around the tooth as I band the root to set a crown, and solder with soft solder, trim and shape it so as to conform in all respects to the tooth and fill with amalgam, let the patient wear it for twelve or twenty-four hours, then request them to remove it. If they cannot do so, I remove it for them, and polish the filling.

In the process of working amalgam, I do not see how you can prevent crowding it upon the tissue or into the margins of the gum between the teeth, when it is used as recommended by those who recommend the Perry separator to hold the matrix.

Dr. L. W. Skidmore: There was one point that I expected to be brought out in the discussion, but it was not done, and that is with reference to malleting the alloy to condense it. This can be done by using a burnisher rotated in the engine either way. It will condense the amalgam so that it can be finished nicely.

Dr. T. L. Gilmer: The paper presented the subject in a satisfactory manner, and I think there is little in it that I would care to controvert. I scarcely see the necessity of malleting amalgam. There is no objection to it, yet it seems to me we may with small shot shaped burnishers place the amalgam in the cavity as perfectly as by malleting it in.

One word regarding electrical influences. We have two teeth, one filled with amalgam and the other with gold. As soon as there is contact between the two metals a current of electricity is established which passes from the baser to the nobler metal. In order to generate a current of electricity a circuit must be established. In the Crofoot battery there is suspended in a solution of sulphate of copper, zinc and copper; these are connected by the fluid and by a wire extending from the copper to the zinc. Of course, a current is produced in the solution which passes from the zinc toward the copper. There is deposited from this solution metallic copper on the copper plate. If two teeth closely approximating each other be filled, one with gold the other with amalgam, when contact between the two is established a circuit is completed. We have through the roots and the vital tissues of the jaw the ground connection, so to speak, and all that remains to establish a current is some suitable connection with the two metals.

This gives a very similar condition to that observed in the Crofoot cell. The current passes from the amalgam to the gold, carrying with it débris and microörganisms which are deposited on the gold and the tooth filled with it. The food particles thus lodged afford the best opportunity for the multiplication and growth of the organisms and as a natural result there is decomposition of the lime salts at the margins of the gold filling, while the amalgam will remain comparatively free from decay. I do not believe that the electric current injures the tooth or gold in it at all.

One of the principal reasons why I think amalgam fillings so frequently fail, is because less care is taken in the preparation of cavities for their reception. If the margins are prepared in such a way as to give an attenuated edge to the amalgam, sooner or later it will chip off and break away, affording an opportunity for the growth and multiplication of microörganisms. I believe that amalgam has a proper place in the practice of dentistry. The pocket-book of the patient must, as has already been said, be frequently taken into consideration. There are persons for whom we can make good amalgam fillings, but who are physically unable to withstand the strain necessary for the introduction and completion of good gold fillings. I have patients for whom I can do no operation upon the teeth in a perfect manner, and it is not my fault. For such patients I can do a better service by using plastic filling material.

Dr. W. V. B. Ames: I would like to ask Dr. Gilmer if I understood him to say that the material about the gold filling rather than the amalgam would be destroyed.

Dr. Gilmer: It is my experience that the enamel is destroyed about the gold and not about the amalgam. I have seen no perceptible change in either the gold or the amalgam of which the filling was composed.

Dr. C. R. Taylor: As bearing upon the remarks of the last speaker, I will say that I had occasion to fill the mesial surface of a molar, adjoining a gold crown, with amalgam, and as soon as I allowed the teeth to come together there was pain, and I stopped it by placing a thin piece of wood between the gold crown and the adjoining amalgam filling. That gave apparent relief. As long as that piece of wood was in place the patient had comfort, but returning again, I covered the amalgam filling, with chloropercha, which gave temporary relief. The patient came back again for relief, and I touched the amalgam filling with nitrate of silver, and from that time to this she has been quiet. I suppose I produced a chemical change, so that this electrical condition spoken of could not take place between the amalgam and the gold filling. In reference to a matrix, Dr. Stevens spoke of Taggert's tin, and I agree with him that in these compound cavities—proximal and grinding or occluding surfaces, the filling to be left entirely quiet until crystallization has taken place, and the matrix remain on until that has taken place. By so doing you will get the most surprising results in such fillings. Instead of Taggert's tin I pre-

fer a thin copper band. The band by annealing can be made very soft, and to get the band close to the gingival margin of the cavity I use a wood matrix or wedge to press the copper band into place, and hold it there until after the filling is thoroughly condensed.

There are reasons why malleting is not a good thing for an amalgam filling. Those who have worked in porcelain of any kind know this. In malleting amalgam, instead of forcing, as you can, by rotation, the body of the amalgam through all parts and thoroughly distribute the body of the amalgam with the mercury, you distribute simply the mercury to the edges. You leave a mercurial edge. Now, by using a burnisher and rotating it in all directions, you are enabled to grind the amalgam into place. If you take a glass tube and mallet amalgam in, then fill with a burnisher, you will see the difference in what you can accomplish. It is not an easy thing to fill a glass tube perfectly when malleting amalgam. You know the effect of an amalgam filling when it is well ground into the cavity and how difficult it is sometimes to remove the last part of an amalgam filling where it is flat, or where the bottom of the cavity is even concave. It is sometimes exceedingly difficult to dislodge the last piece of amalgam. It is that part of the cavity that has the amalgam thoroughly ground into place and almost pushed into the substance of the tooth material.

In reference to amalgam, referred to by one of the speakers, Dr. Black, in building up roots, then putting on crowns, I need not tell you not to use copper amalgam for this purpose because you will have a black looking gold crown as a result.

Dr. J. W. Cormany: It has done me good to-day to listen to the remarks upon the subject of amalgam, from the simple fact that some years ago there was such a wet blanket thrown over it that it never ventured to raise its head from that time to this. In such bad odor was it, that I remember at one of our meetings held in Rock Island, a good brother got up and said he had seen a mouth that had so many amalgam fillings in the teeth that he could take his finger and rub it along the gums and the mercury would drop out like shot down a tower. [Laughter.] Since that time I have been as good a friend of amalgam as I possibly could. It has done me a great deal of service. There is one prominent member of the dental profession whom I have heard make the remark twice, and he did it in such a way that it really made me feel as though I wish he had not said it at all, namely, that he had

never put in an amalgam filling in his life. I will say for him that he has lost a grand opportunity for doing good. There are lots of people with amalgam fillings doing *good* service. They are not to be compared with anything except a gold crown that is to take the place of the broken tooth that was filled up with amalgam years ago.

Dr. A. W. Freeman: I want to inquire whether anything was said yesterday with reference to the patching of gold fillings with amalgam?

The President: I think not.

Dr. Freeman: I understand it was referred to. I rise to say that I have seen some such fillings which have been repaired for five years and are yet good. I would like to know if any one here has a record that will beat this?

I wish to ask Dr. Taylor if I understood him rightly to say that roots should not be filled with amalgam where we are going to put crowns on them?

Dr. Taylor: I said copper amalgam.

Dr. Freeman: I heard the remarks just quoted by Dr. Cormany made by a dentist at the Rock Island meeting years ago. I also remember another member of our profession—both of them are gone now—who said at one time, in my hearing, that he had never put in but two or three amalgam fillings in his life. Of course, that was before it was as reputable as it is now to put in such fillings, and I suppose it was justifiable not to profess to know much about it. When I came to Chicago any young man would have lost his standing in the profession if he had made it known that he was an amalgam filler, and I did not resort to its use very much because I considered it very likely that I should lose my own reputation if I continued it. I have since used more amalgam than some practitioners, perhaps, but my favorite has always been gold.

My thanks are largely due—I may never have an opportunity to express it again—to Dr. Cushing and to Dr. Allport for their kindness to me, and my first ambition was and always has been to equal them in their golden works. A few days ago I took off part of a tooth that was filled by Dr. Allport probably twenty-five years ago, and the filling was as solid as it possibly could be. When I began my work and looked at Dr. Cushing's work, I did not know how to accomplish the results that he had. I was one of those

who failed to get proper instruction when I began the practice of dentistry. My early education in that direction was not faultless. Thank God, I hope I have amended somewhat. I rejoice to-day, to see some fillings I put in over thirty years ago, in the anterior teeth as well as in others, with the teeth remaining in good condition. I only want to say to the younger members of the profession, study the works of others. Gather in all you can get from these societies, and our dental periodicals, do the best you can, know how to do it, and you will have your reward. [Applause.]

Dr. F. H. McIntosh: I think I may safely say that the majority of the members of the dental profession use their hand as a receptacle for the combination of the alloy and mercury. It is not the proper way to mix them. I think the scales should be employed. The proportions should be carefully weighed, and mortar and pestle used in the combination; not grinding so hard that an over amount of heat may be produced, but sufficient for the combination of alloy and mercury. I do not object to palm mixing afterward. A great many use the amalgam not pressed out. I do not think this good practice. I think the surplusage of mercury should be squeezed out in chamois skin and small proportions used, and the body of the filling built up in this way. I do not see any use in washing amalgam with alcohol or any other wash.

Dr. Taylor: What is the use of weighing your metals and mercury if you squeeze it out afterward? Can you squeeze out the right proportion? After you have washed some out can you add so as to exactly get the right proportion?

Dr. McIntosh: You must have a certain amount of each to form a combination.

Dr. Taylor: Yes, but what is the use of squeezing it out? The exact proportions of each have not as yet been discovered. Weighing comes the nearest to it, and you will have a small surplusage of mercury even then.

Dr. McIntosh: You squeeze out when pouring it in the hand and adding a little more of each as the mixture may require. If you have a little too much mercury you add a little of the alloy, and so on. It makes no difference whether the surplusage of mercury is taken from the mass before placing in the cavity, or taken up from the surface of the filling when nearing completion by any of the methods in vogue.

Dr. H. J. McKellops: I have been standing by the profession for a good many years. I have taken a deep interest in it and watched it carefully, and I say now that I never saw a worse curse on the head of the profession than the use of amalgam. I have never yet seen the time when I would want to use amalgam. I have been a hard worker in the profession, and I ask you to look at the mouths of people who have amalgam fillings in their teeth. Look at the destruction of those teeth. Let us take, for example, the teeth of small children. What is put into them? Amalgam. There is no child from six years up to twelve that I cannot take and fill its teeth with oxyphosphate without the slightest particle of decay taking place in them. In educating our young men in the profession we must teach them how to do artistic work, something that will do themselves credit Gold is therefore the thing to use in filling these teeth, and I am a strong advocate of honest, durable, substantial work.

Dr. Edmund Noyes: I will not say anything in regard to the main question of amalgam filling or its use or abuse. Least of all would I undertake to reply or make remarks upon what has been said; what I wish to say is that in these discussions we are too apt to speak of amalgam and an amalgam filling as though it were a definite and constant material, as gold or tin are. The fact is that the characteristics, the working qualities, and the methods of handling the various amalgam alloys are so radically different that the things you say about one may be wholly inapplicable to some other, and those who listen may apply the statements to the wrong one, and be misled by them, or else they think the speaker very wrong in his views. For instance, there is one that requires only a small proportion of mercury, about one part to four and is probably best amalgamated by shaking in a mixing tube and not squeezed much till in the cavity. Another requires about five parts of mercury to six of alloy and needs to be ground in a mortar, and both need to be mixed in pretty near definite proportions and no mercury squeezed out, so that we may have in the tooth just what the maker of the alloy has carefully compounded. Other amalgams may probably be better prepared by using an excess of mercury, to be squeezed out after mixing. These great differences should be taken into consideration when we talk about amalgams or use them. They are so important that it is not worth while to be continually handling a large number of different amalgam alloys

in practice. Three or four different ones may be used to suit different circumstances and requirements, and the working qualities of these we should become familiar with, but we can scarcely do the best work with amalgams if we are continually changing off to a new and strange one.

It has been constantly spoken of here in relation to the manipulation of amalgam in compound cavities, that a matrix should be used, and it seems to me the importance of that can scarcely be overestimated. The practical questions relating to the choice of a matrix are, convenience, accuracy of adaptation, and facility of placing and removing it. A few special cases will require special devices, improvised at the time, but for nearly all, the Ivory matrix and holder is the most satisfactory of those I have happened to use. Its greatest advantage over others being the ease and quickness with which it can be placed and removed.

In some cases a wedge is required between the matrix and the adjoining tooth to bring it close enough at the cervical border of the cavity. Such a matrix makes a box of the cavity into which the amalgam may be packed with as much care and force as necessary without danger of having the corner slump off or the material displaced in one place by pressure upon another. The matrix must allow the crowding of the material over the margins of the cavity, and for this, a ball burnisher will not do, but a small or thin one must be used.

It does not seem to me that malleting benefits it, though I am not able to say it does not. It is my belief that the amount of surplus mercury should be very slight, so that under careful and vigorous packing little or none should come to the surface, for there is room for suspicion at least, that when we see mercury coming to the surface upon which we are packing it also comes to the surfaces next the walls of the cavity. Its subsequent reabsorption into the filling leaving the most important portion the most imperfect. The exposed surface can be taken care of by overfilling it and absorbing the excess of mercury with tin, the overfilling being sufficient to insure the removal of all tin used for this purpose. If the amalgam sets rapidly the matrix may usually be removed as soon as the packing of it is completed, and the material packed and burnished over the margins and most of the surplus removed, so as to leave little to do but polishing at the subsequent sitting.

The advantages of leaving a matrix on for twenty-four hours are doubtless considerable, and in some cases important, but the difficulties in respect to the occlusion, and the adjustment of a matrix in such a way as to be left on without discomfort, are often rather serious, as well as the additional labor of removing the large surplus after it has fully hardened.

If amalgam fillings are made with the greatest care they are not the work of a few minutes, and there is just as good opportunity for the display of art and taste in making and finishing them, as in making gold fillings of the same form and general characteristics. So far as artistic qualities in the operator are concerned, there is about as good opportunity for the display of them in the use of amalgam as gold.

So far as the question of skill is concerned, the fact that you work three hours on an operation instead of one does not necessarily imply that you exercise any higher degree of skill. The fact is that the proper handling and use of amalgam requires a wider range of knowledge and skill and experience, than the corresponding handling of gold if you want to get the best results that the material will give you.

Dr. G. D. Sitherwood: Regret very much that I did not hear this paper, but after listening to the discussion must come to the same conclusion that I have on previous occasions, namely, that amalgam is the most readily worked and most uncertain material for the preservation of teeth of anything that has ever been presented to the profession. I have examined many fillings made with amalgam, some of them by inexperienced operators, that are saving teeth just as well as I can save them with amalgam after years of experience using the best formulas, mixing and packing in the very best manner. I suppose there are gentlemen here who can do better, but I have more failures in attempting to save teeth with amalgam than with any other material.

I was glad to hear the remarks made by Dr. McKellops with reference to the use of gold, being assured that with his long experience he is correct in his statements. Until we get some definite formula of silver and tin—not aluminum, my friends—the mercury soon dissolves that into the oxide of aluminum, it will not do in an amalgam filling—until we get some definite formula of tin, silver, zinc and gold, or other metals, the exact amount of mercury, how to mix it, and pack in the tooth cavity, we will still go on in the same indefinite and unsatisfactory way.

Dr. H. H. Townsend: I think more amalgam fillings are spoiled in the mixing than in almost any other way. There is too much mercury added to begin with. If very little mercury is used at first, and the material is rubbed either in hand or in a mortar, until it is reduced to a fine black powder, the addition of a very little more mercury, will amalgamate the entire mass, and will make a much tougher and more cohesive filling and requires much less mercury than it will if the mercury is all, or nearly all added before it is rubbed down to a fine powder.

This applies to all the amalgams I have used in the past twenty-eight years, except copper amalgam with which I have had but little experience.

The use of the tin foil in the surface of the filling to absorb the surplus mercury in finishing I am satisfied does harm, and has caused many failures. It makes a nice hard surface to the filling which is very apt to shrink away from the margins and leak, probably from the unequal distribution of the mercury.

Dr. C. H. West: I feel very diffident in getting up before so many old and wise heads in the profession, but I have a few thoughts that if I can find words to express them, I would like to do so. My favorite filling is not amalgam, and yet in a country practice the biggest part of my work in filling teeth is of amalgam, and I believe it requires as much skill to put in a perfect amalgam filling as it does to put in a good gold filling, perhaps not as high a grade of skill, but it requires skill just the same.

With reference to putting amalgam fillings in the front teeth, as was spoken of in the paper, my idea of that is a great deal like Dr. Harlan told us in regard to filling roots. He says, in the first place, do not put in carbolic acid, and in filling front teeth I say, do not put in amalgam. It looks bad for one thing, and you can do better work for your patient, and more satisfactory to yourself, with a good grade of cement. When that wears out you can renew it, the inside of the cavity around and under the filling is not decayed, whereas in amalgam fillings it is likely to do so. Taking the teeth as represented yesterday, the mesial part of the first molar and the distal portion of the second bicuspid, our essayist would have us, or he, at least puts in a gutta-percha filling in one tooth and an amalgam filling in the other, consequently he has to have another sitting to replace the gutta-percha with amalgam. For some years I have been using a little instrument the shape of

a clamp. It is small. It has a wedge at each end of the spring clamp and these wedges are concave on both sides so as to conform to the contour of the tooth. I take a thin strip, slip it in between the two teeth having proximal cavities; wherever I can get floss silk I can get a thin strip, and if I think it is best to do so I can put in two of these thin strips, then I take my clamp forceps and just slip the little matrix clamp between in this way (illustrating). The pressure of the wedge clamp presses the teeth apart, I then insert my filling, and when the pressure of the wedged clamp is removed my fillings knuckle together. This matrix can be pressed around the tooth, and with floss silk can be tied in place, and at another sitting the fillings may be finished, or finish at the same sitting. As perfect contour of filling, with amalgam, as with gold, may be placed, and there are cases where amalgam fillings are really preferable to gold in saving the teeth that are so weak they would not bear the malleting of gold.

Dr. Don M. Gallie: I rise more for information than anything else. Dr. Pritchett has changed the name of his paper from "Amalgam" to "Amalgam Fillings." It is held by many authorities that amalgam shrinks in a certain direction; that it shrinks greatest through its long diameter. Expansion through the short diameter has been proved in preparing the cavity for such a filling. In preparing an interproximal cavity in a molar the walls of the cavity from buccal to lingual side should be shorter at the margin than at the occluding surface. The tendency of amalgam is such that especial preparation of the cavity should be made for receiving it. When it shrinks it has a tendency to do so in ball form.

In regard to the malleting of amalgam, it is generally believed that amalgam should be put in while using a matrix, and when we strike the metal we spread it beyond the surface with which it comes in contact. If we have a matrix around a tooth, instead of having mercury driven into the undercuts of the cavity, it will be driven out on the surface, and by the application of cotton it can be removed. If the amalgam is made in the proper proportion and then mixed with mercury, the removal of mercury causes a change in its proportions, and if we squeeze out any surplus does it not destroy the proportion of which the amalgam is made?

Dr. A. W. Harlan: Without entering into the discussion of this subject, I would like to say that I think it would do this society

a great deal of good to read Brandt's book on metallic alloys and amalgams, and Spohn's work on metals.

Dr. W. F. Green: I desire to report a case that came into my office some time since which was amusing to me.

The doctor on my right (Cormany) spoke of squeezing out shot from under the margins of the gums, and the gentleman from St. Louis reported some other cases.

This lady came into my office in company with her husband and he did the talking. She was refined, educated, and one of the leading society ladies in the city in which I have the privilege to reside. She was hard of hearing. After taking the chair and removing a partial gold plate she put her index finger on a certain tooth she had left. By the way, she had two on the left side and one on the right above. The second tooth was a first molar and in it was an amalgam filling which had been placed there so long ago that she had forgotten when it was put in. She had pyorrhœa very badly, and of course under the circumstances I extracted the three remaining teeth; when she came back for an impression for a temporary plate some four weeks after that she said, "doctor, do you know that that amalgam filling had a wonderful effect on my hearing." She said she was informed by a certain physician that the mercury that was used in the amalgamation of the metals in that tooth had a decided effect on her hearing, and that since I had extracted the tooth her hearing had entirely recovered. I asked her a few questions in a moderate tone of voice, but she kept straining her neck and twisting her head so to see the motion of my lips so as to translate what I was saying. I said "yes, I see that your hearing has improved wonderfully." She finally made up her mind that she did not understand what I had said, and leaning over to get closer to me she asked what I had said, I told her in a loud voice that I noticed her hearing had greatly improved. Now such cases as this with others that I have heard of prove to me that the poisonous effect of the mercury in a filling is a myth.

Dr. Pritchett (closing the discussion): I do not know that I can add much to what has been already said. You have had a good wrestle with the topic and I do not now regret having brought it before you. The interest has been quite considerable, and I have no doubt some impressions of this discussion will be carried home by many members and the subject more carefully studied than it has been heretofore. If I rightly remember, we have had nothing

upon this subject in the shape of a paper since I have been a member of the society. Incidentally the subject has come before the society, in connection with other topics. There is certainly a state of unrest in the profession as indicated by the frequent articles in the dental journals upon this question. I did not know whether any one present would advocate under certain conditions the use of amalgam. Dr. Perry, of New York; Kester, of Chicago; Kells, of New Orleans; Darby, of Philadelphia, and others whom I might mention, are all men of good reputation in dentistry, these men have all written about it. I do not know that I can better close my remarks than by quoting from the Lord's Prayer, "Lead us not into temptation, but deliver us from all evil."

RECIPROCATION OF FORCE IN ORTHODONTIA.

By C. S. Case, D. D. S., M. D. Chicago, Ill.

When Archimedes proposed to lift the world if he had a place upon which to rest the fulcrum of his lever, he tacitly expressed the same fundamental idea that arises often in the mind of one who contemplates the correction of malposed teeth.

A dental regulating apparatus is an instrument interposed between a moving power and a resistance, with a view of changing the direction of force or otherwise modifying it. Therefore, it is a machine subject to the same laws of force as other machines.

There are certain fundamental principles underlying the action of applied force in a dental regulating machine which are not always recognized or fully appreciated, and which I believe to be important for us to consider in this advanced stage of orthodontia.

One of these comes under the head of Newton's third law of motion, which is: "To every action there is always an equal and contrary reaction; or the mutual actions of any two bodies are always equal and oppositely directed."

The word "action" as is used here may signify *pressure, quantity of motion, or energy*, of any kind, *potential* or *kinetic*.

Whatever the pressure of a certain force in any given direction, it can never exceed the action of the force in an opposite direction.

When the direction is rectilinear—or in a straight line between two points of application, as the push and pull force of a screw, the power exerted at one point is never more than that exerted at the other; the combined action being always equal to the motive force expended in setting the screw in motion.

To one who has given little thought to this subject, it is difficult to eradicate the idea of computing force in terms of work, and often at first thought will be led to interpret this law as meaning, that in the accomplishment of any action of force in one direction, only one-half the magnitude of power can be utilized—since the other half must be expended in an opposite direction.

For instance, if a screw possessing a 100 pounds pressure has an attachment at one end that is absolutely immovable or sufficiently inert as not to be moved by a 100 pounds of force, while at

the other it yields to the force in a way to indicate the exact amount of pressure received, we will find that the entire force of the screw is registered at the kinetic attachment, and will continue to be exerted until it has accomplished the full 100 pounds of work—barring friction, etc. If it is in the raising of a weight, or in pushing a spring scale which registers 100 pounds of force in that direction—and, according to the law, if it exerts an equal pressure in an opposite direction—one is inclined to imagine that 200 pounds of power is in use.

In the example cited none of the original force has been transferred from the screw and expended apart from it in work, but instead it has merely piled up at one end in the form of potential force, still exerting its 100 pounds of pressure upon the static anchorage at the other end of the screw, since it requires 100 pounds of pressure to hold the scale at that point. If now we substitute a second scale in place of the anchorage attachment, it will register but fifty pounds. That is fifty pounds of the original 100 pounds of power will be transferred from the first scale and go into a form of work in raising the second scale to an equal and opposite potential force, when the two will be brought to equilibrium.

This consideration is important practically in the movement of teeth with a screw, and teaches that whatever power we put into the screw, while equal and opposite pressure or force is exerted at both ends, the power is transferred and expended in a movement of the malposed teeth in proportion to the inertia of our anchorage attachment.

This rule would not hold true with the use of elastic or continuous force, though the inertia of anchorage attachment or the utilizing of the opposing force is quite as important for other reasons.

By examining the forces of a "lever of the first order," we will find that "action," in the form of pressure at the point of work, or weight, is never equal to the pressure at the fulcrum, the difference being always equal to the immediate pressure at the point of power, regulated by the the relative lengths of the arms.

As an example: The arm of a steel-yard, or any balance scale, is the long and short arm of a lever, and its point of suspension is the fulcrum. When the arm is brought to equilibrium the down-pull or force exerted at the fulcrum—without counting the weight of the machine itself—must always equal the sum of the weights of the mass that is being weighed and the counterpoise or power.

In computing the forces of ordinary machines, little thought is given to action beyond points of power and work, because the *reaction* to the working force is sustained without loss of power or harmful influence by the foundation and superstructure; or the inertia of the machine itself.

In this particular it differs vitally from a dental regulating machine which possesses possibilities that cannot be computed in like manner from a basis of easily acquired inertia to act as an extraneous rest or anchorage to working forces, else as few difficulties would be presented to us as would have been to Archimedes had he found a base upon which to rest his lever.

In the proposition for regulating malposed teeth, the machine is suspended, as it were, in mid air, where all the motive force supplied by the operator is exerted in opposing directions upon immediate vital environments; and therefore it is quite as important for us to care for, and direct, the force of reaction, as it is that of the desired action.

My object in presenting this somewhat lengthy introduction to the subject of this paper is to draw your attention sharply to the importance of that force which must always be exerted in an opposite direction to every working force, that you may fully appreciate the desirability in orthodontia of taking advantage of every opportunity whereby it may be redirected as a reciprocating force to needful channels of work instead of allowing it to be expended in useless or harmful tendencies.

For years a plate fitted to the teeth, covering a portion of the mucous membrane and commonly the roof of the mouth, was used as a base to receive this opposing force, with a view of distributing it over so broad a surface that it was not equal at any point, to the inherent inertia of the part. Now, that regulating plates have been relegated to the past—for reasons I need not mention here—the principal aim of the modern constructor of regulating appliances is to either distribute this opposing force to a number of teeth, or, by virtue of methods of attachment, to the roots and alveolus in which they are imbedded, or—what is of most importance—by neutralizing it at points of anchorage by an equilibrating force in an opposite direction, for the movement of other malposed teeth.

In proportion as two opposing working forces can be made to reciprocate each other, the motive power of the apparatus or machine is expended at points of work and neutralize at points of anchorage.

This, I believe, to be the most important and scientific consideration in the construction of dental regulating appliances. Those who have had little experience in this department with modern methods can hardly appreciate the importance of taking full advantage of this principle in the management of mechanical force, or realize the variety of opportunities for its exhibition that will be presented to a thoughtful and ingenious mind. During the era of regulating plates little thought was given to this phase of our sub-

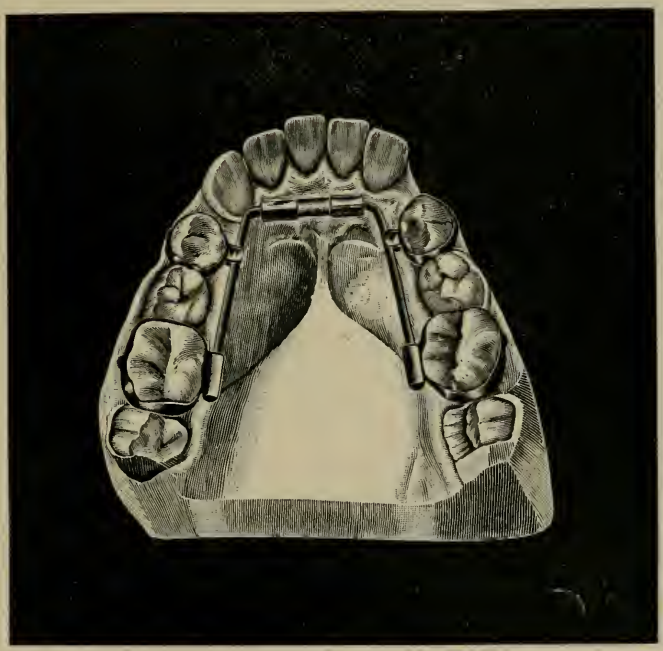


FIGURE 1.

ject. And even to-day, unfortunately, it is not uncommon to see two or more jack or traction screws, springs and bands with opposing or anchorage force centered upon a single plate; where with a much simpler and more effective device, both the plate and the expenditure of this surplus force could be avoided.

Not so very many years ago it was the common custom in carrying grist to a mill, to balance it upon the horse with a stone in one end of the bag; and I suppose the man who suggested the idea of parting the grist, getting rid of the stone and one-half the weight, was considered by that portion of the community who are

always loath to leave a beaten rut, as much of a crank as men will always be considered who are a little in advance of the times.

In attempting to classify the simple forms of irregularity of the teeth where reciprocation of applied force is always indicated, I may mention: First, instances where two teeth near each other in the arch, or on opposite sides of the same jaw, require to be forced in opposite directions. When the teeth so placed require an unequal force to bring them to position, the inequality may often be neutralized (1) by a difference in the relative points of applying the force; (2) by so constructing the appliance to obtain an unequal distribution of it, and (3) by an arrangement for transmitting the surplus force to a static anchorage, or to other teeth which require to be moved.

In the proposition for making one malposed tooth move another (if I may so state this principle of reciprocation), where both are posterior teeth on opposite sides of the jaw—and especially if they are inferior teeth—the employment of a screw for reciprocating the two forces has heretofore been considered inadvisable on account of interference with the tongue, speech, and mastication. This difficulty may be obviated by using a right and left jackscrew, so constructed that the body of the screw rests just back of the anterior teeth, while rigid arms extending from its ends are bent back to the points of application. (See Fig. 1.)

In the operation of expanding or contracting the dental arch, this implement will be found invaluable in many instances where the force of a spring is out of the question. As it has never been published, I will here describe an easy method of constructing it—without a lathe—according to mechanically correct principles; for upon this will depend its practicability.

As the body of the screw in applying the jack or traction force is made to turn upon the threaded ends of the arms, any deviation from a direct line in these two screws would cause a wabbling and detract to that extent from the ease of its management, and also endanger the loosening of the bands.

In constructing a dozen or more of these instruments, three German silver tubes, about six inches long, should be drawn. The first one should be made of plate (No. 26 B. and S.g.) and drawn to the proper size for threading it internally with a tap cut in the No. 4 or 3 hole of the Martin screw plate. The second and third tubes are made of plate (No. 30 B and S.g.) the one drawn to exactly fit outside the first tube, and the other, or third, to fit inside

of the second. You are now equipped with material for making the bodies for reciprocating jackscrews of different lengths.

The first tube you will cut into pieces one-eighth or one-tenth of an inch long (see first, Fig. 2); the second into pieces one-fourth of an inch long (see second, Fig. 2), and the third into pieces varying in length from one-fourth to three-fourths of an inch; in proportion as you wish to vary the length of the instrument (see third, Fig. 2). The first pieces cut are fitted into one end of the second pieces and two of the pieces so fitted are slipped on to the ends of the third pieces, and so arranged that the joints of the tubes shall not fall into juxtaposition. When these are soldered together you have a series of compound tubes, having

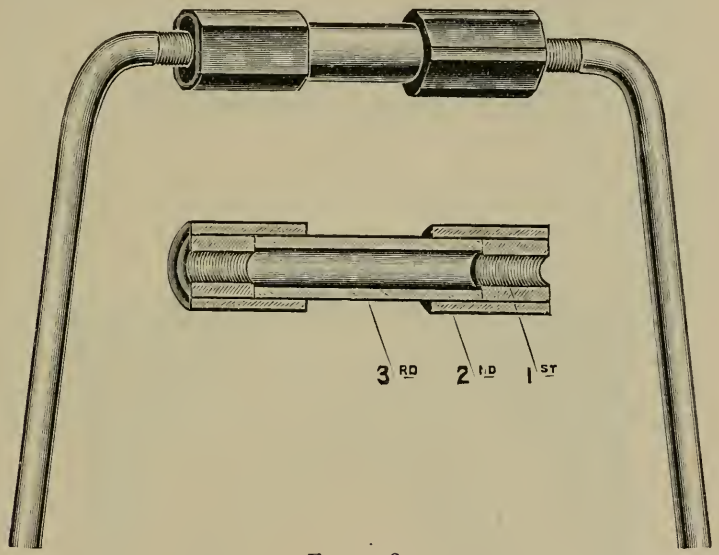


FIGURE 2.

short portions at the ends with an internal diameter less than the central portions, and absolutely rectilinear, to be threaded for the right and left screw arms. The enlarged end pieces are finished on the outside the same as nuts, and so cut that they can be grasped by the wrench at one end or the other at every eighth turn.

The second simple form of irregularity where reciprocation of force is indicated, is where two approximal teeth are standing, the one within and the other without alignment in the dental arch. Here the two opposing forces can be made to reciprocate each other to the neutralization of anchorage force until one or both are

in proper place. In the *Dental Cosmos* for April, 1890, is published a very effective instrument for this work, which I named the "Reciprocating Jack and Traction Screw." Later I added to it an

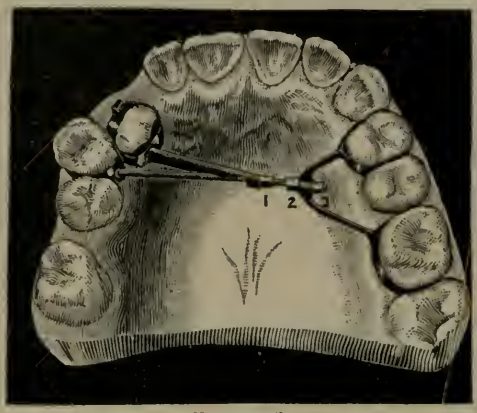


FIGURE 3.

improvement for transferring the surplus force to a static anchorage, which was published in the *Dental Review* for August, 1892.

Drs. Farrar and Angle have presented a number of ingenious appliances for these cases.

FIGURE 4.

Third. In simple torsion force perfect reciprocation can be obtained with the jack and traction screw mentioned above. The screw bar is rolled to a thin ribbon and buttoned to one side of the tooth, while the body or tube of the instrument rests upon a flexible pin on the other side of the same tooth. (See Fig. 3.)

This is the only instance that I know where the force of torsion is all expended in work tending to rotate the tooth upon its long axis.

When Dr. Angle introduced the spring bar or wire for applying torsion force, I opposed it because I found when both ends of the bar were sprung into pipes for rotating two teeth, and even where the long arm of the lever was held by an anchorage tube, there was produced so much friction at these points that instead of

FIGURE 5.

he bar freely gliding in the tubes as the rotating tooth or teeth turned, they acted more or less as immovable attachments with a tendency of forcing the teeth in the direction of the straightening ends of the bar, making it a dangerous method to employ in any case which cannot be seen often, unless this tendency of the force is otherwise controlled.

I am happy to say now that this principle of force is correct, and when properly controlled, as I shall describe, is one that I employ quite extensively.

In nearly all cases of irregularities of the teeth, and especially when two or more teeth require rotating, I enclose the dental arch with an almost invisible wire extending from anchorage attachments at the molars. This wire, which commonly bears a screw

at one end, is drawn from a much larger German silver wire, and becomes highly flexible and polished. To this the ends of the torsion wires are hooked with so little friction that they easily glide along its smooth surface as the teeth rotate to place. Again, any tendency of the rotating tooth to be forced out of alignment is controlled by the encircling wire. Here the force exerted in confining the potential power of the spring lever, is transmitted to the encircling wire and converted partly into a force for holding the *teeth in alignment.* (See Fig. 5.)

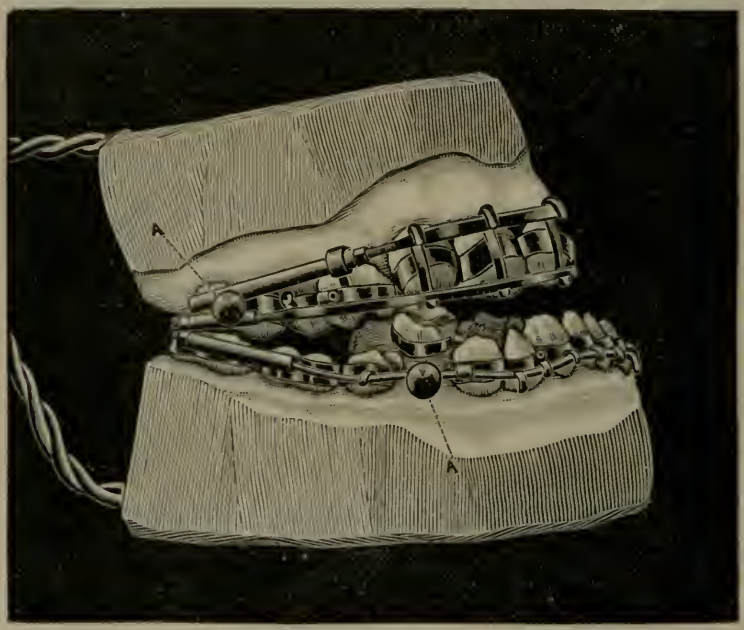


FIGURE 6.

Fourth. I shall not attempt to enumerate the great variety of instances which constantly arise in the practice of orthodontia where that portion of the motive power that is commonly sustained by a static anchorage, or by teeth which should not be moved, may be wholly or in part neutralized by diverting it to other and useful purposes.

Instances often arise where, after a prolonged study of the models of a case preparatory to constructing regulating appliances, the discovery of this possibility is as unexpected as it is pleasing and of practical advantage; for there is no mechanism where the problem of utilizing power and converting it, without loss, into

working force, is of more vital importance than that for the regulation of malposed teeth.

In those operations which have from time to time been brought to your notice, where I have succeeded in moving the roots of teeth and the contiguous bone, for the purpose principally of giving a more perfect contour to the face, the success of the operation depended mainly upon the possibilities of reciprocation, to neutralize at points of anchorage, the great force necessary in accomplishing the object.

Though the bars for producing the required movement ex-

Miss B., æt. 12.

Nov. 29, 1892. FIGURE 7. June 3, 1893.

tended from molar anchorage attachments, the pushing force of one was reciprocated by the pulling force of the other to the full extent of the force expended in keeping the teeth in an upright position, or in moving the roots or the crowns more rapidly as the case demanded. Again, instead of allowing all that portion of the force in excess of equilibrium to be sustained by the anchorage, it was further reciprocated—in nearly every instance—by the use of rubber bands which extended to a bar firmly attached to all the teeth of the lower jaw. The employment of rubber bands extending from one jaw to the other is among the principal means of reciprocating force. "*A*" "*A*," Fig. 6, are the buttons to which the rubber bands in this case were attached. When the anterior superior teeth require to be moved back in the dental arch, the inferior often require to be moved forward, and vice versa; the

force required for one may in this way be reciprocated to the extent of the magnitude of force in the rubber bands employed.

If one will carefully examine the models of these cases, or the half tone illustrations of the models, which will appear in the published proceedings of the World's Columbian Dental Congress, illustrating a paper entitled, "Some Thoughts Relative to Face Contouring," they will find little or no antero-posterior alteration in the occlusion of the posterior teeth, which were used for the anchorage attachments, which conclusively shows that the anchorage force upon these teeth was largely neutralized by reciprocating

Miss E., æt. 14.

June 25, 1893. FIGURE 8. Feb. 1, 1894

the great power which the apparatus must have exerted in moving not only the roots of the anterior teeth, but the entire bony structure in which they were imbedded. In two cases reported, the ends of the roots and contiguous bone were moved forward at least one-quarter of an inch with little or no posterior movement of the anchorage molars. (See Figs. 7 and 8.)

DISCUSSION.

Dr. A. E. MATTESON: I feel very much embarrassed in attempting to open the discussion on the very able paper which has been presented to us by Dr. Case. I feel that this Society has been highly honored, and I think Dr. Case should receive great credit for his excellent contribution. It is to my mind the most concise paper that I have ever listened to on the subject of ortho-

dontia. I think there is more contained in it of great importance, especially of difficult cases, than has ever been presented before, and the full import can be best appreciated by those members of the profession who have made orthodontia a study.

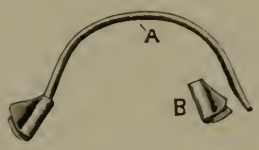
So far as I know, no thoroughly practical appliances have been introduced which will compare favorably with those of Dr. Case for the restoration of the features by that movement of the roots of the teeth; and very great credit should be given the doctor for this. There are some points on which Dr. Case and I

differ in the management of these cases. For instance, Dr. Case has presented this appliance for the expansion of the arch. It seems to me there is one great defect in it. In the first place, it is difficult to make such a jackscrew so that it can be used to advantage in the hands of the ordinary operator. There is one thing faulty in it, and perhaps the doctor will discover it. The bearing should be longer. It should extend as far as possible under here (illustrating), otherwise when the screw is properly brought out and pressure brought to bear on this it will require a short bar. It should be made as long as possible for that purpose. I have found the use of steel piano wire to be the most satisfactory, especially for expanding the arch posterior to the cuspids.

The above cut illustrates a very simple and effective

method of expanding the arch by its use. The molars on each side are banded with a tube on the lingual surface at the gum margin; into these tubes are soft soldered, hard drawn German silver wire, extending to the cuspids and resting against the bicuspids near the gum. A piano wire spring, A, is formed so that when in position the ends will rest against the front ends of the tubes and against the bars to keep it in position; open bands, B, are soft soldered to ends of the wire. The spring may be easily removed for the purpose of cleaning, increasing the tension, or renewing the piano wire. The objection to the use of steel in the mouth is its oxidization.

Another point. About a year ago in a paper read before the Chicago Dental Society, I was considered very severe in my remarks in saying that rubber plates should be relegated to oblivion



for the purpose of correcting irregularities; and I said at that time that there was no place for their use. Dr. Case took issue with me, but he now would consign them to oblivion also.

I did not have the advantage of reading the doctor's paper before I came to the meeting, and I could hardly tell what ground his paper would cover, so I brought along with me some models. This one (exhibiting models) will illustrate that portion of his paper where he speaks of wire being used in rotating the teeth. I will pass it around. It is a very good illustration as showing the reciprocation of force in that direction. The other cast which I present is one where I have the teeth in very good position, and I will pass it around. The case was commenced a year ago the tenth of last April. The cast which I show you is nearly identical with the one taken in January. A slight change has been made since then. The front teeth were banded, the upper cuspid forced out by a jackscrew, and the rest of the expansion was done by a piano wire spring. The anterior teeth being elongated by the use of rubber bands woven over buttons or studs on the bands of the upper and lower teeth.

When the case was undertaken the only teeth occluding were the four twelfth year molars and on one side the first bicuspids

nearly touched at the point of the cusp, none of the other teeth could be brought within one-quarter of an inch of contact.

You will observe in the last cast presented the bite has been brought into a fairly normal position.

The patient was twenty-one years of age.

Another point is the matter of completing a case of irregularity as it should be and not left as it might be by the average practitioner, half completed, thinking that is best that can be done.

I might mention that I have been using a three per cent solution of pyrozone around the roots of teeth. I would like to have Dr. Black give me his opinion in that regard.

Dr. Black: What is the object?

Dr. Matteson: The object in my mind was for the purpose of increasing a deposit there, if that might be done by any outward application. It would doubtless put the roots in good condition.

Dr. Black: If the case is kept in good condition it is all that is necessary. The physiological work will go on perfectly, and I do not know of any way to help it.

This matter of holding teeth has been spoken of, and it is an important feature for the general practitioner who does not do very much regulating. The teeth are not properly held. To hold them a year is exceedingly indefinite. Some cases you can turn loose in two months and get good results; others you cannot let loose under three years. It will depend upon conditions entirely as to how long these teeth should be held. I have a case now that has been held for over three years, and still I am not willing to take off the stay or support.

A Member: How old is your patient?

Dr. Black: Twenty-five years of age, but on account of loss of some teeth, some malpositions, they have not thought it best to correct the teeth. When the support is removed and the teeth return to the original positions they will require a great deal more time in order to become stationary and remain so, and it will depend largely upon this matter of support. If, regulation is completed, and a perfect arch and perfect occlusion has been secured, unless there is something abnormal in the case, that is not corrected, much less time will do. But certainly we should not say hold them a year and turn them loose. We can easily slip off the stay. Let the teeth go until we know they are going to stay by actual trial, and they should not be turned loose in any other way.

Dr. C. B. Rohland: I do not rise to discuss this paper, but

when the doctor closes the debate I want him to tell us where he gets his taps and dies to cut these right and left screws, or whether he makes them himself. Some time ago I wanted something to cut right and left; I sent all over the United States and I could not find anything. I will be glad to have information on that point if he has any.

Dr. Sitherwood: I do not rise to discuss the paper particularly because I have had little experience in Orthodontia. I have listened to Dr. Case's paper with a great deal of interest and have examined the ingenious apparatus for regulating teeth, but in closing the discussion I would like to have him answer whether he thinks the ordinary practitioner can manage cases of this kind successfully along with the other operations in dentistry; whether he would consider it necessary for a man to do this kind of work to give his special attention to it, or whether it is worth while for the average practitioner to go extensively into this kind of work.

Dr. Black: I would like to know how any man can do this work until he has learned *how*.

Dr. Sitherwood: I take it for granted that he learns how. After he has learned how, will he have the time to do it and attend to his regular duties as a practitioner of dentistry? A man can only do so much in a certain length of time. He cannot practice medicine and dentistry and be an oculist and pursue several other specialties in medicine or surgery. He can only do so much.

Dr. J. N. Crouse: I shall not attempt to discuss the principles laid down in this paper nor any particular cases, but I will say on general principles that in my opinion the time to regulate teeth is when they are coming into position in the mouth; that is as the child's teeth are erupting to assist nature a little if they are irregular. That requires considerable care, but it is not a very complicated operation. For instance, if the central incisors come into the mouth, turned half way or one-quarter way out of position, how are you going to regulate them? The longer you wait the more difficulty you will have in getting these teeth into position. The proper thing therefore to do is to put on an appliance to turn these teeth into position before the other teeth are erupted. For instance, if central incisors are turned half way around when erupted, they occupy less space than when in proper position. The same is true of the laterals, hence the necessity of turning every irregular tooth before the adjoining ones erupt, otherwise the arch will have to be enlarged to secure the necessary space. I have had cases where

each front tooth had to be turned when erupted; in such cases as soon as the teeth had sufficient growth, I put on appliances, so that when they were full grown, every tooth was in its proper position.

If these cases had been left alone until all the teeth had erupted, it would have taken four times the amount of work to place them in position. It would have taken a complicated apparatus to have placed the teeth in position and secured proper occlusion, as when full grown the teeth are more difficult to move, and the arch would have to be enlarged before the teeth could get in proper position. The principle holds good in nearly all cases where children's teeth are coming. Unless the form of irregularity is such that pressure of the lips or tongue will bring them into place, they should be operated upon just as early as possible. I should lay that down as a principle of regulating or correcting irregularities of children's teeth without attempting to describe the different apparatus. Twenty-five years ago, when a case of irregularity presented itself, we did not have the complete descriptions and drawings we have now in some of the publications that have appeared on this subject; and I do not think there is any excuse now for any practitioner to allow a child to grow up with irregular teeth, as we have made rapid advances in regulating, and the works that have come out on this subject in the last ten years are accessible and sufficiently helpful for any dentist.

The only point I would emphasize is the matter of holding the teeth in position after you get them there; and holding them long enough to prevent their turning again when the apparatus is removed. If you take a patient in adult life and change the position of the teeth in the mouth, it will be necessary to hold them a number of years. I have a case I have had seven years. I have taken the apparatus off and found it necessary to replace it two or three times within the last two years, and I do not feel quite safe now in taking it off. An exception to what I have just talked about is the narrow arch, as it is easily regulated and easily kept in position when corrected, since an ordinary rubber plate in the roof of the mouth will keep the required width secured.

The greatest number of failures come from not keeping the teeth in position when once regulated.

Dr. GILMER: Just a word or two in regard to the turning of teeth. I am afraid we stop too soon. They should be turned considerably beyond their normal place, then the tendency to resume their original position is lessened.

Dr. Case (closing the discussion): I do not think I have anything particular to say in closing, inasmuch as the subject of the paper has not been touched on except by Dr. Matteson. The paper is entitled "Reciprocation of Force in Orthodontia." I was very anxious to get the expression of the profession in regard to that particular point, and I am sorry there has not been more said in regard to it.

Dr. Sitherwood's question seems to be entirely irrelevant and beyond my ability to answer. So far as my knowledge goes of the profession in general, the question can be answered in this way: That practitioners usually make an attempt to correct almost every case of irregularity that comes into their hands instead of sending such cases to a specialist. When I see some effort on the part of the profession to do otherwise, I will then believe that you appreciate the fact that the specialist is more capable than an ordinary dentist to do this work.

The holding or staying of teeth in their place after having been corrected is one of the most important, and oftentimes the most difficult to accomplish, and especially if the teeth have been regulated with the ordinary regulating plate. I think that is largely due to the fact that the dentist expects a regulating plate to hold teeth in place without any further effort on his part.

If you are using the proper kind of appliances the bands need not be removed. The appliance is not at all offensive to the patient and the teeth can be held there for two or three years if necessary. But there are all varieties of cases. In some the appliance can be removed in a few months, while others have to remain for several months or years.

In regard to taps and dies. I use the Martin screw plate, believing that to be the best. It can be obtained at Swartchild's, Masonic Temple, Chicago. He can supply you with both the right and left screw plates. The taps should always be made in the screw plate that you have. The taps should be made in the screw plate you use, because there is often a difference in the size and thread of holes of the same number in different screw plates.

The President: Do you consider it necessary to rotate the teeth farther than you have shown?

Dr. Case: No, sir. But it is not a very bad plan to carry them a little beyond their proper position, because with almost any appliance, however firm, the tendency will be to revert slowly in the other direction.

OPERATIVE DENTISTRY.

By J. J. Jennelle, D. D. S., Cairo, Ill.

Operative dentistry is that department of dentistry which pertains to the surgical treatment of the teeth and surrounding parts. It means every appliance necessary to do the work; it means a knowledge of therapeutics, chemistry, metallurgy, and the skillful use of tools.

The scope of this subject is so great it seems hardly possible to present a detailed paper, and I shall be brief, saying only enough to provoke, as I hope, a healthy discussion. In the preservation of the permanent teeth very little if anything new in the line of filling materials has been presented since the last paper on this subject before this society.

In filling teeth several important steps are to be considered. Among the first is the preparation of cavities in which general rules may be followed. Many failures in our operations result from lack of thoroughness in this respect. The cervical walls of approximate and buccal cavities are often poorly and imperfectly prepared for receiving fillings. A large number of these suffer from renewed attacks of caries, are undermined and soon give out. The time was when it was our delight to give a filling a fine, smooth finish, much to the neglect of proper preparation of the cavity, but now no conscientious dentist thinks of placing a filling until he can first see every minute corner and crevice of his cavity and know that a thorough preparation has been made.

In large distal cavities in bicuspids and molars extending from the gingival line up to and often involving the occlusal surface, we have about the worst class of cavities to fill, and generally the most difficult to get at. Extensive separations have to be made with separators, or a free use of chisels, or both. It is necessary to let in the light and make room to work. The enamel margins should be left strong, smooth, and slightly rounded so there may be no friable edge when the filling is finished. The gingival margin should be rounded somewhat so that if gold is used for filling, it may be burnished down before receiving the final finish.

The base or floor of the cavity should be squared as much as possible so the filling may have a solid foundation to receive the strain of mastication. If gold alone is used, the filling should be commenced with noncohesive gold in not too large pieces, condensed under hand pressure or very light malleting, and then finished with cohesive gold. These gingival margins are often covered with tin, tin and gold combined, and amalgam.

Any of these combinations with gold make a good filling, and when the tooth contains a live pulp, seldom if ever any discoloration takes place. It is claimed by many that certain chemical action takes place between the metals, that has a tendency to harden the tissues of the teeth, thus leaving them less liable to renewed attacks of decay. With this class of cavities and fillings, the matrix if properly applied is a great assistance, enabling us to make very natural contours with a minimum amount of material, and facilitating the work. In the Brophy, Woodward, and Guilford matrices some one may be found that can be used, no matter how difficult the case. For condensing gold I have found no pluggers equal to, or giving such general satisfaction as the set brought out about a year ago by Dr. Royce, of Chicago. They are illustrated in the current numbers of the journals and there fully described. There has been no new form of gold for filling presented of late. I confine myself to foil—cohesive and noncohesive—altogether, using Nos. 4 to 60, and make my own cylinders. In simple cavities, good fillings can be made with foil as with any form of gold, and where large contours are required, a filling can be made that will stand the friction of mastication better, and be less liable to scale off and show pitted surfaces in a short time. Heavy foil should be used in finishing all contour work.

For finishing gold fillings at the cervical borders I am very partial to the use of draw cut files. The set brought out some time ago by Dr. Black are very useful to me. There is an acute sense of touch with all hand instruments that we do not get with disks or burs in an engine. In drawing a file gently over a margin, the touch tells us whether we are on gold, enamel or dentine, and the experienced practitioner knows at once whether that margin is perfect or if there is overhanging gold.

Many an otherwise good filling has been ruined by the injudicious use of disks at these vulnerable points.

That "much used and much abused" compound called amalgam is still a very useful servant of the dentist. If we exercise as much care in prepairing cavities, thoroughly amalgamate in a mortar (a simple rubbing in the palm of the hand, in my judgment is not sufficient) wash with alcohol or bicarbonate of soda, be as careful in packing as we would in using gold, and make future appointments to polish thoroughly, we have fillings that will last for years. There is a great variety of alloys for amalgam, and nearly all very good. One composed of silver sixty parts, tin thirty-five parts, and copper five parts, I have used for several years. It has good edge strength, is very fine grained, takes a smooth polish and I see very little tendency to shrink or ball.

As to the cements they still have their place in the list of filling materials. The best results can be obtained from them by finishing the filling while the cement is in a plastic state. By so doing we get a hard vitrified surface we cannot get by cutting down with chisels, files or disks after it has once hardened. If the filling can be kept dry thirty to sixty minutes after it is complete, it is all the better. The copper cement introduced by Dr. Ames makes a good filling except for its very black appearance, compelling us to use it where it will not show. It has all the good qualities of the copper amalgam with none of the bad, does not discolor the tooth nor will it tarnish adjoining gold fillings or crowns as the amalgam does.

In badly abraded teeth, whether from mechanical or chemical causes, I believe it to be good dentistry to restore them to servicable length by placing on them solid occlusal contours of gold. Where the incisors and cuspids of the upper jaw fall directly upon the corresponding teeth of the lower, we usually find in patients of advanced age and reasonably robust health, the teeth of the upper jaw and sometimes in both jaws, badly worn from constant friction. This abrasion often extends to the bicuspids and molars, though not to the same extent. The usual method has been to build on gold facings with foil depending on undercuts in the end of the tooth or retaining screws to hold the facings. Where many teeth were treated in this manner in the same mouth some of them would soon batter down or scale off, thus rendering nil a great part of the work.

For the past few years I have employed a very different method by dressing the end of the tooth perfectly true with corun-

dum disks, and casting up solid gold facings to fit the tooth and of required length. This can be done by making an impression in cuttlefish bone of the tip suitable for the case, and casting the metal into it. Make the joint between the facing and the end of the tooth as perfect as possible. The success of the work depends largely upon the nicety of this joint. If a tooth contains a live pulp, drill three or four holes parallel with, and at safe distance from the pulp, about one-sixteenth of an inch deep to receive dowell pins soldered to the facing. If the pulp is dead and canal filled, solder a platinum loop to the facing and cut into the end of the tooth deep enough to receive the same. Cement the facing to the tooth and we have a piece of work that will stand any hard usage. Cuspids and bicuspids can be restored to very natural shapes. When these facings are used up to about one-eighth of an inch in length they are superior to any crown that can be set on a tooth.

The treatment of pulpless teeth and pulp canals preparatory to fillings and crowns is a very important department of dentistry, and has received a great deal of attention from the profession during the past ten years. There is scarcely anything new to be said on the subject beyond noticing a few new medicaments advocated during the past year, but as I have used none of them I am not prepared to pass judgment. The principal points to be obtained are thoroughly aseptic canals, freedom from periosteal disturbances and complete fillings of the canals to the apex of the roots with some material compatible with the tissues of the tooth.

Large contour fillings in the anterior teeth of whatever material have of late years most entirely given place to crowns of some kind, and when properly constructed of all porcelain, or porcelain fronts, present a more harmonious appearance. The Logan crown, simple in its construction and easy of adjustment, is in more general use than any other, but I prefer for these anterior teeth one made after the order of the Richmond crown, with no gold showing in front, for the reason that with a band fitted tightly to the tooth, there is less danger of secretions working in between the root and the crown. In making these crowns it is best not to solder the facings on, but pursue the method suggested last year by Dr. Taggart, and described very fully by Dr. A. W. McCandless in the March number of the *Dental Review*.

When all fittings have been made ready for soldering the

backing to the cap, slip the facing off and cover that surface of the backing with plumbago or common stove polish mixed to the consistency of thick cream, forcing the plumbago into the pinholes, then invest and solder. The solder will not flow over the plumbago, leaving the holes in the backing perfectly free. When taken from the investment, with a drill of proper size drill through the solder on the back, countersink the hole and rivet on the facing after placing cement between it and the backing. A crown made in this manner, with care in all its details, stands paramount to all other crowns. It is free from any possibilities of fire checks and danger of changing the color of the porcelain by heat.

A word for the children. Their claims cannot be ignored. Their attention should be called to their teeth as early in life as possible. They should understand their true value and how necessary they are to their health, comfort and personal appearance. If children are kindly treated and their confidence gained, much can be done for their comfort. When placed in our charge it should be our aim to preserve the deciduous teeth in the jaws until nature provides for their removal.

When decay has set in and fillings are necessary, it is nice discrimination sometimes to tell just what is best to use. In narrow fissure cavities tin foil is an excellent material on account of its freedom from thermal changes, its plasticity and ease of adaptability to all the irregularities of the cavity. In large crown cavities with walls unbroken, we get the best results from amalgam, as it resists the force of mastication well and is easily inserted, its range of usefulness is wide, it can be employed in nearly all cases. In incisors and cuspids the cements should be used even if frequent renewal is necessary. Also in posterior teeth where decay is extensive and dentine sensitive it can be used without much excavating.

In conclusion I would say that many points in this practice have not been touched upon, but I trust what has been omitted may be brought out in discussion.

DISCUSSION.

Dr. GEORGE H. CUSHING: Mr. President: I have very little to say in opening the discussion on this paper, but there are one or two points that I would like to refer to. With regard to any criticism of the paper, the only criticism I have to offer is with respect

to that portion of it in which he refers to the preparation of cavities at their margins, particularly their cervical margins, in which he says they should be slightly rounded. They never should be rounded. That is contrary to all mechanical principles. That sort of margin gives a feather-edge to the gold. A rounded margin is not a proper one over which to attempt to pack gold.

With regard to the sort of margin that should be made, I will say what you all know as well as I do probably, that it should be as he intimates in his paper in speaking of the preparation of the cavity. The cervical wall should be as nearly at right angles with the long diameter of the tooth as it is possible to make it, but the enamel margin should be slightly beveled, not rounded. In this connection I want simply to call attention to a point which seems to be very much overlooked with practitioners generally, as to the packing of the gold over these margins. I think I may say from my observation in watching the operations of a great many gentlemen that it is here where they fail so frequently. This failure is not confined to the younger men, but the fault I speak of is prevalent among the older practitioners. In the first place, with reference to the packing of gold over those margins at all, I think a great mistake is made of using the mallet too soon. I think these margins should always be covered by means of hand pressure until a sufficient thickness of gold is secured over the margin to enable the operator to mallet lightly with safety. Then with reference to covering the margins, supposing it to be prepared as we claim it should be. This represents the cavity for the purpose of illustration with the proper bevel. I think the great fault in the packing of gold over these margins arises from a want of appreciation of the importance of having the instrument bear directly upon the surface, the plane of the instrument to correspond with the plane of the bevel. You naturally suppose the foot plugger is used in covering this point. (Illustrating.) The plane of the plugger does not correspond with the plane of the bevel. A great many operators seem to think if they have a foot plugger it does not make much difference what the angle of it is, and they apply it over that margin imperfectly. (Here Dr. Cushing made further drawings to illustrate his remarks.) I think this accounts for many of the failures that occur at the cervical margins.

The paper is very admirable in its general tenor, especially as to the essential points of care in preparation of cavities, the ne-

cessity for seeing all parts of the cavity and making the margins particularly perfect. It is perhaps a little hobby of mine (and I think it is a pretty good one) and forty odd years' experience in pursuing the method convinces me that I am right, that no man can do perfect work as a rule in all these cases without the use of the lens. No man can make the preparation of cavities at these margins as well without as he can with the use of the lens. One who is not accustomed to its use may soon demonstrate that fact if he will make use of it for a little while. He will find after he has his cavity perfectly prepared, his margins perfectly smooth, if he applies the lens he will see he is not right. There are inperfections. The lens reveals what the naked eye never detects. Let me say the lens can be used in a very much larger proportion of cases in the mouth than one would suppose. By throwing light properly in the mouth it can be used in the majority of cases in the observation of the molars as well as of the anterior teeth.

The essayist speaks of tin and gold as a filling for the cervical margins in proximal cavities. I think it is of doubtful value myself. I have used it somewhat experimentally and from my own experience in the use of it and my observation of a great many cases of those who have been enthusiastic about it, I am satisfied it does not answer any better purpose, and I think not as good a purpose, as purely noncohesive gold over these margins. I had occasion to observe a great many cases that had been treated in this way by a gentleman who is deceased, and many of his patients happened to fall into my hands. He had been using this method for quite a while, was quite impressed with the value of it, but I fail to see that it preserved the margins any better than noncohesive gold would have done, and I think not as well. They were very defective soon after the fillings were placed there. So I do not believe that it is as good practice as the use of noncohesive gold, when the latter is thoroughly packed over these margins.

Reference was made to Dr. Royce's pluggers. I think there is no question that the forms of Dr. Royce's pluggers are the right ones, a slightly convex surface. That shaped plugger tends slightly to spread the gold laterally, though not I think as much as Dr. Royce claims that it does. The spreading force grows less from the central point as you get toward the extremity of the face of the plugger. But there is a tendency to drive the gold laterally every blow that is struck. There was one point which he referred

to which is of great importance, with regard to the delicacy of touch requisite in the finishing of the cervical margins, using the instruments devised by Dr. Black or the proximal plug finishers of the S. S. White Dental Manufacturing Co. It is that delicacy of touch alone that will enable us to do that finishing satisfactorily. There was an admirable editorial in the *Dental Cosmos* three or four months ago regarding the importance of cultivating this delicacy of touch. The practitioner who has it more thoroughly cultivated and developed than another will do the more perfect work at these margins. With reference to the lens again, if we could apply it and examine the margins after we have secured, as we suppose the most thorough finishing of them by means of the files and other appropriate instruments, we should still find imperfections that do not reveal themselves except by such an examination. There are many cases of proximal fillings where the cervical margins can, I think, be more perfectly finished by means of very delicate curved chisels similar to one of the scalers that is known by my name—a very thin, slightly curved chisel, which will shave the gold off, using the enamel surface as the guide.

Dr. H. H. Townsend: I want to compliment Dr. Jennelle on his excellent paper. There are some few points perhaps on which I differ with him in a general way, nevertheless the essay is a good one. I noticed what he said about rounded edges or margins, and had in mind the correction made by Dr. Cushing, that the edges should be beveled instead of rounded, which I think is what the doctor intended to say. I endorse what Dr. Cushing has said about the lens. Have used it for many years and find it impossible to prepare cavities as perfectly without as with it. Also find it very valuable for examining the fillings at different stages of the operation, and especially for packing gold around frail margins.

There is one point of importance that was not mentioned in the paper, and that is the difference in *appearance* of sound and partially unsound enamel. We cannot judge of the condition of the enamel entirely by the feel of the instrument. It may cut quite hard and yet be in a state of partial disintegration. Perfectly sound enamel, when polished, has a glassy, or horny appearance, and when I find a place in my margins that has no luster, but is of a dead white look instead of the clear shiny surface, I know it is not sound and cut away until sound enamel is reached, which often necessitates the cutting of the cervical wall to the gum line.

We nearly always find these places in the lateral walls of proximal cavities in molars and bicuspids, and they are the remnants of softened enamel which developed into a cavity in the central portion, but which fades out into a thin line of superficial decay, at the borders. It requires a good light to always detect these imperfections, and by turning the chair or the patient's head so the cavity can be seen in different lights, it will aid very materially in determining whether it is sound or unsound.

One point that has not been mentioned is the different methods of annealing gold. Thirty years ago I annealed my gold on a Russia iron heater, but for the past twenty-two years have used a mica heater which I much prefer, and still use it. For a short time however I yielded to the then popular theory that gold should be absolutely soft, or *very* cohesive, and annealed in the flame, but my gold did not work satisfactorily, especially about the margins; it was too stiff and unyielding. The gold should not be left too long directly over the flame, but just a sufficient time to anneal it, which is usually but a few seconds, and when properly annealed the color deepens to a reddish or coppery shade, and just at this time it can be easily picked up on the plugger and will work very much like soft gold, and yet is tough and cohesive. If annealed beyond this point it is difficult to pick it up on the plugger, and its working qualities are very materially injured. That gold annealed in this way is sufficiently cohesive has been proven by rolling out old fillings into thin sheets of gold without a flaw.

In filling large cavities, the time saved by carrying the gold directly from the heater to the cavity on the point of the plugger instead of alternately changing from plugger to pliers, and *vice versa*, is of considerable importance.

Dr. E. H. Allen: To illustrate take a cavity in the proximal surface of bicuspid or molar if the cavity be small, and only enough tooth structure is cut away to cut out the decay, and then allow the teeth to come together. The chances are that the conditions that caused decay in the first place are not changed and decay will begin again at or around the filling. Why, because with such a narrow filling it is impossible to get that rounded contour necessary to keep the tooth structure from coming in contact, and there is a space favorable to the retention of food.

Now, if the cavity had been cut out well toward the buccal and palatine surface so that a well contoured filling can be put in,

when the teeth return to their places the tooth structure will not be in contact, only the rounded surface of the fillings. Thus we have changed the conditions that once induced decay.

Dr. G. V. Black: I will ask Dr. Cushing a question. When he began speaking, he spoke of the fact that very many dentists condensed gold over the cervical margin too soon, but did not tell us what he meant by too soon. As that point has not been brought out, I would like to have him explain it.

Dr. Cushing: Many dentists in beginning to pack their gold after the preparation of the cavity, commence to pack it over the margin of the cervical wall too soon.

Dr. Black: I understood you to say that you condense with hand pressure until there is a sufficient mass of gold at the cervical and enamel margins to justify the use of the mallet.

Dr. Cushing: I think that is what I meant to say.

Dr. Black: Perhaps as I had the matter in mind as Dr. Cushing began speaking, I misinterpreted his words, but I do think there is much failure which occurs from condensing gold over the margin too soon, too early in the process of building the filling. While in such a cavity as this illustrated here I should lay my cylinders clear back into the cavity and allow them to extend out over the cervical margin, I should begin the condensation in the axial portion of the cavity. If it is a little bulky I would condense it lightly with hand pressure. But I would condense it thoroughly and build across against my axial wall and against my lingual and buccal walls and get perfect security of that mass of gold before condensing over this (the cervical) margin (illustrating) at all. We used to see men begin and condense at once over the cervical margin as though they feared they never would get their gold against it. The point is this: Get stability, absolute freedom from fear of movement of any portion of the mass of gold before condensing over this (the cervical) margin.

Dr. Taylor: What wall are you speaking about?

Dr. Black: The cervical, or gingival wall.

The President: Please explain the term axial wall.

Dr. Black: That wall opposite the axial surface opened by decay. The long axis of a tooth has about it four surfaces, the axial surfaces include the four surfaces aside from the grinding or occlusal surface. Hence this being the axial surface and opened

by caries, this wall of the cavity (the wall opposite the open surface) would be the axial wall. Now, with this portion made secure, there is a sufficient cushion of gold upon that (the cervical margin), and I do not care whether you condense it first with a mallet or with your hand pressure. But do not take a mallet and drive it down onto that wall, your instrument cutting through the gold into the wall and spoil it by chipping the margin. Do not do that. Have a sufficient cushion of gold to work upon, and be sure you are driving your gold before your instrument and not cutting through the gold. I prefer to condense my cylinders as a rule by malleting cohesive gold onto them. They do not move after that. Sometimes I find it necessary to condense cylinders before I put on my cohesive gold, but generally not. I condense them by malleting my cohesive gold onto them with a good cushion of gold over my margin so as to avoid any injury of it.

Dr. Woolley: I would like to ask how you keep the filling in place there. As I understand it, you make no anchorages in the cervical distal wall, but the anchorage is in the crown. How do you keep each particle of gold secure in position, so that there is no movement until you make your anchorages?

Dr. Black: In these cases I keep it there by main strength. I fill many cavities in which I have no anchorages whatever in the axio-cervical portions. I fill a mesial cavity occupying the mesial third of a tooth with no anchorage whatever except in the middle third of the occlusal portion of the tooth. In the large cavities we must do that in order to have a sufficient strength of wall. For instance, when we have a cavity occupying a considerable portion of the mesial third of a tooth, we undertake to groove the remaining portions, the buccal and lingual walls, we weaken them too much, consequently we must fill those without any anchorage whatever in that portion of the tooth, depending upon the central third of the occlusal portion for our anchorage, we first place our cylinders, and build upon these with cohesive gold, the gold being held with the instrument until the anchorage is made complete or fairly secure. It must not be allowed to move at all. Let me say that the development of the persistent care necessary in this holding is something that is slow and difficult for young men to acquire. The mere placing of the instrument and holding it steadily with a given pressure while doing the building is not an easy thing, and assistants, without having a considerable amount of

training, are not to be depended upon to do it. It must be done by the operator himself. Let the assistant do something else.

Dr. Woolley: I am very anxious to get a clear idea of your mode of procedure in regard to filling such a tooth as you were going to fill yesterday in the clinic. The point of anchorage that you would make would not be toward the mesial crown surface and the first bicuspid where the decay has occurred from the mesial surface to the distal cervical margin, but your main anchorage, as I understand it, you would make near the crown. How would you manipulate your gold so as to make the perfect security necessary for wear?

Dr. Black: The cavity occupies the whole mesial surface. It will show a little bit of the tooth on one side, and here it occupies the whole mesial third of the tooth, we will say. Looking at it from this direction we have a cavity like this. (Illustrating.) I always try to get this pretty sharp. Of course, this is beveled and this represents the outline we should have when we are done. Now, we will cut across the occlusal surface to the distal, about the depth of the enamel, sometimes a little more, may be a little less, and stop there. That step will occupy all of the middle third from mesial to distal, although in some cases it will pass into the distal third, and sometimes close up against, or into, the distal marginal ridge. That is the ridge of enamel that runs across the distal margin of the tooth, running may be to there (illustrating), depending upon the amount of strength necessary to obtain enough anchorage. We must not cut this deep, if we do we ruin the strength of the tooth.

Dr. C. R. Taylor: After hearing the remarks of Dr. Black and Dr. Cushing with reference to cervical margins and the condensation of gold, it seems to me the same rule in reference to the condensation of gold on the cervical walls holds good of all the walls. First, have a good pad of gold before condensing on any of the margins of the cavity.

I will refer to one thing in reference to gold caps on teeth where they are worn away by erosion either chemical or otherwise. It is difficult to cement a cap of that kind securely on the tooth. I had a case a short time ago in which I found it impossible to cement it and make it stay. The way I overcame the difficulty was by amalgamating the inner surface of the gold cap slightly with amalgam and then the cement held it securely.

In reference to annealing gold, I want to say the best method I ever tried was in a case of this kind: I was called to the house of an invalid to fill a tooth. I left the office without the annealing lamp, and I asked that they furnish me with an ordinary kerosene lamp. They brought me one with a hollow wick. I held the gold over the top of the large chimney of the lamp and never saw gold work as nicely as that did.

With regard to the gold and tin combination, so far as my experience goes, one benefit to be derived from it in finishing is the ease with which the gingival margins can be finished.

Dr. G. D. SITHERWOOD: I was very much pleased with the paper and regret that we did not have it read earlier in the convention.

With reference to filling the class of cavities that have been spoken of by Dr. Cushing and Dr. Black, I have used different kinds of gold—crystalloid, or sponge gold and the cylinders, and tried beginning these fillings with gold and tin and all the other methods recommended, but have found nothing in my practice that has been so satisfactory as what is known as the corrugated gold foil, made by Williams and other manufacturers, using that with cylinders, or what you call soft gold. I hardly distinguish between soft gold and cohesive gold. It is all soft when it is pure, but by annealing it becomes cohesive. Instead of using cylinders I start this class of fillings by making a cushion and using hand pressure around the margins, the gold foil being folded and cut in small squares or oblong pieces as desired.

The point made by Dr. Cushing in reference to the use of the lens, is an excellent one. I have nearly all my professional life used a watchmaker's eyeglass for the anterior teeth. I intended to exhibit the one I use, the rim made of aluminum of course, as they now make those glasses. I find it very convenient when I wish to use both hands. I recommend a lens of that kind.

Dr. TOWNSEND: Does not the jewelers' lens injure the eye any?

Dr. SITHERWOOD: No. Every watchmaker will tell you that his "glass eye" is the best. I see a little better with the right eye than with the left, having used the lens on it most, and for that reason I have learned to use it on the left eye. It saves the strain on the eye that is necessary to see the margins.

REPORT OF THE COMMITTEE ON DENTAL SCIENCE AND LITERATURE.

By A. W. Harlan, A. M., M. D., D. D. S., Chairman, Chicago, Ill.

The custom of reporting annually the advances made during the year past in dental science has been growing for some years in this and similar organizations. The writer does not believe in taking from the authors of "hints" and "compendiums" the subject matter which belongs more particularly to them. In deference, however, to the requirements of the standing rule, which says: "Whose duty shall be to report annually on the progress of science and literature as appertaining to dentistry and give a résumé of all that may be new and important," I submit the following: In science pure and simple great progress is to be noticed in bacteriology and allied subjects. The efforts now being made in some quarters to mummify pulps of teeth and preserve them *in situ* meets with some favor in certain quarters, but so far nothing scientific has come from the discussion. It will require more time and further experiments before it will be considered safe to seal a dead pulp in a tooth and place over it a finished gold filling destined to be permanent.

Nothing new has been developed in the etiology of pyorrhœa alveolaris, although many articles have appeared on the subject during the year. At least a dozen such articles have been published in one journal, *The International*, in a few months. Weil's admirable process of cutting hard and soft tissues is going the rounds in microscopical circles and has been well received, especially in Europe. As usual, much activity is seen in the laboratory products of antiseptics, hypnotics and antipyretics. Many such articles have only a short lived popularity. The ingenuity and avarice of the pseudo dentist and his local anæsthetic is receiving a rich reward at the hands of the weak-kneed, poorly equipped, semi-respectable hanger-on in dentistry. No public clinic is complete without the appearance of such a fakir and the competitive hanger-on-to-the-skirts-of-respectability always buys the only original secret local anæsthetic with the exclusive right to a town or county or State. Of course this is not science, but it is the truth, and science can

wait awhile. Any dentist of moderate ability and a dental college education acquired in the past twenty years, who reads only one dental journal and buys one book a year, can relieve all necessary pain in dental operations from his accumulated knowledge. The recent graduate, of course, is even better qualified to do this than his more elderly and old fogy frater. The principal work in applied science is in the field of orthodontia so ably handled by Farrar, Guilford, Angle, Case and Jackson in the East, and Goddard in the West. The work done by this sextette in the past year is better and will be more lasting than that in any other department of dental activity. There is nothing new in prophylaxis, or in the filling of teeth, except the gradual abandonment of the use of copper amalgam. This "fad" developed so rapidly and ran its course so wildly that the more competent and sober minded, only use it, in third molars, which is where it naturally belongs. None of the goods that I have used ever acted as well as the old original bought in England in 1878. Attention has been called anew to tin as a filling material. Tin in shavings, or cohesive tin is worthy a new trial. Care should be exercised in using sulphuric acid fifty per cent for opening difficult root canals. It should not too long remain in the tooth, and afterward the tooth should be well washed with an alkaline solution.

Prof. Miller has written somewhat exhaustively on the subject of green stains on the teeth which may well arrest your attention for a period long enough to admire his method of handling the subject. Practically, for daily use there are no results to the reader. The question as to the deleteriousness of the stains is left in the dark as he believes that the stain does not act in a causal relation to erosion of the enamel surface. The question has only been started and technical writers here have an opportunity to clash sticks with the author of microörganisms of the human mouth.

A subject which has received much attention recently is hypnotism, the further discussion of which as it relates to dental surgery it is impossible to foretell. Our own opinion is that it will not be practiced much under its present name by individual dental surgeons, although it may be used in public hospitals and infirmaries.

LITERATURE.

Three new dental journals have appeared in the United States in twelve months. *The Pacific Coast Dentist*, *The Busy Dentist* and

La Revista Dentista Americana. One has laid down, become defunct. One consolidition has been effected. The new books worth reading are about as follows.

The National and United Dispensatories; Richardson's Mechanical Dentistry; Evans' Crown and Bridgework, new edition; Smale and Colyers' Diseases and Injuries of the Teeth; Miller's (new) Microörganisms of the Human Mouth; Frederick Hewitt's Anæsthetics and their administrations, and G. Viau's work on the same subject. Catching's Compendium is richer than usual in good matter, well selected for the practical dentist; Underwood and Braine have published a little book on anæsthetics which is of value to the English practitioner more than the American as he uses an anæsthetic about five times to one on this side of the water. Guilford's second edition of Orthodontia is practical and concise; Wharton's Minor Surgery and Bandaging is an excellent work; Roger and Godon have published a very good work in French on the dental laws of Europe. Claude Martin, of Lyons, France, and M. Ayräpää, of Helsingfors have each published works on buccal and nasal prosthesis that are far in advance in perfectness of detail and utility. A new edition of Wedl's atlas is out in English and Warnekros has a new work on development of the teeth.

There are four new editions of dictionaries, mostly medical, out in good style and nearly up to date.

In concluding this report, imperfect as it is, I desire to say that the work of the year now in press "Transactions of the World's Columbian Dental Congress," Chicago, 1894, will be one that will be worth the price of subscription. No report of the meeting so far published will be as complete because all reports are lacking the illustrations and authors' corrections. It does not matter so much what a dentist reads as how he reads it. If, with a full comprehension of the meaning of an author he will be benefited even though he may be on the other side of the question. I have often read seemingly useless books, and one or two I have in mind now that only served to comfirm me in the disposition to discern whether it had been "cribbed" or was inaccurate. It will not do an author much good nowadays to copy too much; elementary works are too numerous for a full grown practitioner to always read a borrowed description of the antrum before empyema is discovered or even to regale one with a list of chemical formulæ that may be found in every text-book. What is much more wanted are some

results of solid thinking and actual personal experiments or experience. We have had too much of the "trying it on the dog" to use a common expression, in our recent text-books, and particularly in some of the journals. Fine writing is much admired but after reading some of the magazine articles on the "injurious effects of amalgam filling," and a series of articles on the "togetherum of where" published in a well-known and somewhat aged journal, we feel that some new inspirations are needed to inject a little virility into some of the work of the maudlin admirers of everything that is done by a certain well advertised mutual admiration society located some distance from the setting sun. In brief, if you make a discovery, print it; if you have an unusual case, report it; if you do some original work, tell how you did it but do not read a little bit about a subject and then rush into print and show your ears so every one can see them. The ostrich never did succeed in hiding his body by poking his head into the sand, nor can a scientist do this. As the years go by I am forced to the conclusion that a report on such subjects as science and literature can scarcely be more than a brief generalization of the most important work of a few workers and writers, and that the energies of our members can be better utilized in listening to and discussing something less wide spreading than either of the titles covered by this committee, on dental science and literature.

NEW BOOKS, 1893-4.

1. The testimony of the teeth to man's place in nature, with other essays on the doctrine of evolution.—Balkwill, F. H.

2. A practical treatise on artificial crown and bridge work.—Evans, Geo.

3. Orthodontia, or malposition of the human teeth, its prevention and remedy.—Guilford, S. H.

4. Praktische Zahnlehre zur Altersbestimmung der Pferde, nach der Natur gezeichnet.—Schwab, C.

5. Elements of chemistry and dental materia medica.—Cassidy. J. S.

6. Manuel pratique de dentisterie operatoire et notions elementaires d' hygiene buccale et de therapeutique dentaire à l'usage des medecins.—Nun, L.

7. Essais d' anesthesie locale en chirurgie dentaire au moyen de la tropacocaine.—Pinet Camille and Geo. Viau.

8. Les accidents de la première dentition.—Poinsot, P.

9. Formulaire pratique pour les maladies de la bouche et des dents.—Viau, G.

10. Letters from a mother to a mother on the formation, growth, and care of children's teeth.—Mrs. M. W. J.

11. A monthly periodical devoted to dental science and literature—the Pacific Coast Dentist.—J. D. Hodgen.

12. Die Entwicklung und Degeneration der Hartgebilde im Tierreich in ihrer Bedeutung für die Degeneration des menschlichen Gebisses.—Fenchel, A. D.

13. Die Krankheiten der Mundhöhle, des Rachens und des Kehlkopfes.—Rosenberg, A.

14. Diseases and injuries of the teeth, including pathology and treatment.—Smale, M. and J. F. Colyer.

15. Quinta dentizione in un fanciullo di dodici anni; memoria latta alla r. accademia delle scienze dell' instituto di Bologna nella sessione del 30 Aprile, 1893.—Ajutolo, Giov.

16. Des resultats eloignès de la prothèse immediate dans les resections du maxillaire inferieur.—Martin, Claude.

17. Transactions of the Odontological Society of Great Britain. Vol. 25. New Series.

18. Notes on anæsthetics in dental surgery.—Underwood, Arthur S.

19. Ueber die Pathologie der Zahnpulpenpolypen.—Frank, Karl.

20. Orthodontia, ou malposition des dents humaines; moyens préventifs et curatifs; traduction du docteur G. Darin.—Guilford, S. H.

21. Des injections tropacocainiques comme anesthesique local en chirurgie buccale.—Hugenschmidt, A. C.

22. Essais d'anesthesie locale, en chirurgie dentaire, au moyen de la tropacocaine, observations cliniques et experiences sur les animaux.—Pinet Camille et George Viau.

23. A practical treatise on mechanical dentistry.—Richardson, Joseph.

24. Lekzü po boljezniam penago dietskago, vozrasta.—Kassowitz, Max.

25. Unfug der zahnärztlichen Pseudo-Doktoren.—Wiede, J. H.

26. De la leucoplasiè buccale.—Clémenceau de la Loquerie.

27. Tooth extraction; a manual of the proper mode of extracting teeth.—Gorham, John.

28. Anæsthetics and their administration; a manual for medical and dental practitioners and students.—Hewitt, F. W.

DISCUSSION.

Dr. C. R. E. Koch: I have not the ability, if I had the disposition, to open the discussion on the report of the committee on Dental Science and Literature. I simply wish to rise to compliment the writer on the admirable method of treating the subject and his evident conception of the real purpose for which this committee was originally created. I believe I had the honor of being the first member of that committee under that rule, and while I at that time fell far short from carrying out the idea, that governed the conception or creation of this committee, I now feel that the committee and particularly the last member occupying that position, has fully grasped the import of the work for such a committee. It is a source of gratification to me to see the subject so admirably and scientificially handled as it was in the present report. It gives food for thought, for future work. I think that the committee appreciates the scope of its duty perfectly when it states that what is wanted is not a rehash of elementary propositions that are generally found in our text-books, but the report of new thoughts, new discoveries. The report should be a stimulant in the society to deliberation and of successful use in the practice of its individual members of all new things found to be valuable.

I came in a little late and did not hear all of the report, but I will say the more reports we can get in that direction, the more will they lead us to a higher field in the realm of scientific attainment as a profession.

Dr. T. L. Gilmer: I have several times before had something to say about this committee when I was a member of it and while I am not now a member of it I hardly like to let it pass by without some remarks. I have always taken the ground that I believe Dr. Harlan has taken this time, that the work of the members of this committee could be better spent otherwise.

Dr. Harlan: I thought the vastness of the subjects of dental science and literature precluded the possibility of making what would be considered a satisfactory report to be read in a few minutes. I still think that.

Dr. Gilmer: I believe that the report can be better made by one individual than by three as heretofore, and the report of the committee this year is superior to those of previous years. That this is true I do not believe any one will doubt, although the gentleman who has made the report has had a hand in former reports, which indicate to me that one person can make a better report than three or four. I am pleased with the work that has been done this year. It is valuable, but infinitely better work might have been done by the committeeman had he devoted himself to some subject of original investigation. He could have presented us something that would have been superior in many respects, and the time spent on this report might have been better spent in other directions.

Dr. Edmund Noyes: I believe I need not say anything except to congratulate the society and myself upon the plan which has been successfully carried out, namely, to reduce the number of this committee to one member instead of three. It was done deliberately in the conviction that the work would be better, and I believe we are convinced now of the correctness of our judgment. I hesitate a little to endorse Dr. Gilmer's belief that time could certainly have been better spent upon more specific work for this society than the preparation of such a report. If it were true that we were all closely reading men, that we were all taking most of the dental journals and were buying most of the new books, so as to keep ourselves informed pretty widely of what is going on in dental science and literature, then it would undoubtedly be the case, but a very large proportion of dentists are too busy for that, or their habits of study have not fitted them for it. Their range of inclination is too narrow, and it seems to me worth while for this society to listen to some one man who has the ability, the range of knowledge, and the inclination to present a rapid and general survey of the field of science and literature for the past year, and while I will not for a moment pass judgment as to the comparative usefulness with which Dr. Harlan can spend his time, I am perfectly well satisfied that it is useful to spend it in this way, and bring to us such a report as we have had today. (Applause.)

Dr. C. N. Johnson: I have no disposition to discuss the report that has been presented by Dr. Harlan, owing to the fact that I was not in the room when it was read, but I certainly

think, as Dr. Noyes does, that we can profitably listen to a report by a gentleman who is conversant with the literature of the profession each year, and that it is profitable to the society. I do not see either that it is an entire waste of time to the gentleman who prepares such a report.

Dr. Geo. H. Cushing: I am one who has found more fault with this committee than anybody else in the society heretofore, and I wish to congratulate the society and to thank the committee for the work it has done. I congratulate the society from the fact that the committee has begun to wake up and to understand what it was intended for. That, they have never done before, and I was sorry to hear any one suggest that this work was idly or unprofitably done. It seems to me that this report carries on the face of it the worth of such a thing to a body of men like ourselves. Probably not one man in twenty of this body is capable of judging what is best to be read. I am not. I do not read everything that comes along. I have not the time to do so. There are men like Dr. Harlan who do read and are familiar with what is published, and who can tell us what is best for us to select, and that was the sole purpose of this committee, the original conception of it, and until to-day it has not been acted upon. That is to say, the former members did not seem to realize what was intended. I hope this committee will be continued, and that Dr. Harlan will be the sole member of it. Furthermore, I hope we shall have a series of reports of this character which cannot fail to be valuable to this body.

Dr. T. W. Brophy: I regard the report of this committee as an index to the literature of the profession, and I regard the subjects named therefore of more importance than those we have laid aside. I want to endorse what Dr. Cushing has said. We have had presented to us in most condensed form such matter of the greatest importance to us, and consequently I have to endorse what the other gentlemen have said, that it is a very valuable report. There are few of us who can read French and German, and even if we could translate these languages we would overlook important statements. A man may have a dozen journals, he looks over the matter of greatest interest to himself and lets the points of greatest importance to others go. If it is carefully read by some one who is capable of giving it to us in condensed form, it cannot fail to be of value to us. As I have previously remarked, it

is simply an index to the literature of the profession, and we can quickly gather anything we desire for special work, and gather matter upon special subjects from different authors.

Dr. T. L. GILMER: I do not think any gentleman who has spoken believes for a moment that I decry or undervalue the report that has been made. I said it is the best report that we have had. The only point I would raise is that it would be better for the society to have an original paper by Dr. Harlan on some subjet that he is in the habit of writing upon. He is so capable of doing certain kinds of work that it seems to me he has lost valuable time in doing the work of this committee.

Dr. C. R. TAYLOR: There is one point that Dr. Harlan called attention to that I would like to emphasize, and that is in reference to our younger men going into the study of any subject in placing less dependence upon what others have said and done, and more on themselves, more individualism—more inspiration and less aspiration, if you please; more giving up of self and putting self into daily life, their literature and their science. As I understand it, Dr. Harlan has carried out exactly what this committee was intended for, namely, to give us a *résumé* of what has been done in dental science and literature of importance during the past year, as well as all that has been written during the past year, giving it to us in such a way that we will not have to go over the same field to find out how much *poor* chaff there is and how little rich wheat.

Dr. HARLAN, (Closing the discussion.): The making of a report on dental science and literature is one that is not very congenial, because the committee has to read a great deal of poorly written, illy digested and poorly constructed material. The question in my mind is now and has been as to the actual value of it to the profession. The subject of the report has been on my mind continuously for the past six weeks, although I have thought more or less of it from time to time during the year, but could not give it any attention until six weeks ago. To look over all the journals and new books and the reviews of books and find out what the various reviewers and authors have to say on different subjects is one that in itself is little short of drudgery, but I like to read things that are as bad, for instance, as the history of anæsthesia by Nevius, recently published in New York, or a work like the "Rise, Fall and Revival of Prosthesis." There is nothing in such a book, but you have to read it to find out that it is of no value. All these things

go to confirm you in the belief that only the best kind of books should be read by men seeking information, and that third, fourth and fifth rate authority does not constitute authority at all, and if it has been a source of gratification to the society to hear the condensed report of what has taken place during the year, I am very glad of it. If it is decided to continue this committee for another year, I will try my hand at it again. My own individual inclinations, however, run in the direction of writing a paper on some one subject of more practical interest.

REPORT OF THE COMMITTEE ON DENTAL ART AND INVENTION.

By W. V. B. Ames, D. D. S., Chairman, Chicago.

As on more than one former occasion your committee finds its most fruitful sources of valuable matter in the fields of crowning and bridging and electrical apparatus adapted to facilitate our operations, but in addition we consider that you can profitably consider a few processes, materials and instruments of more or less recent introduction. We have reason to congratulate ourselves on the results obtained by various inventors and manufacturers in their efforts to adapt the electric motor power to our apparatus in ways which accomplish great saving of manual labor and the utilization of the galvanic current in lamps, cautery points and root canal dryers very satisfactorily. Not only have the various forms of apparatus for driving burs, mallets, etc., been devised which are much superior to what we were able to procure a short time since, but the motors themselves have been perfected to such an extent that they may be placed in the operating room in close contiguity to the patient without being decidedly objectionable.

The new Doriot engine, which has features considered by many as most desirable, is now upon the market and can be readily adapted to electrical power. Handpieces, straight and angled, and mallets are readily interchangeable, and that positive propulsion of the bur, etc., is obtained, which can be obtained only with engines built on the principle of the Bonwill, Webber, Perry, and this, the Doriot.

The Crowdus motor and accompanying apparatus, on account of its compactness and comparative noiselessness, deserves your inspection.

The method of utilizing electric motor power devised by L. J. Mason & Co., has now been tried for more than a year and has given satisfaction to a large number.

In crown and bridge work the drift at present seems to be, and happily, to efforts to produce more artistic effects by the use of more porcelain and less gold. For the carrying out of this

prosthesis some admirable furnaces have been constructed and the processes have been simplified by the introduction of lower fusing porcelains and enamels, till an outfit can be furnished with which a novice, comparatively speaking, can construct very artistic and satisfactory small pieces such as single crowns and small bridges. With the Sand Midget, the Downey or the Matteson furnaces, and the Close, Wilmington Rose, Ash and Downey bodies, small work can be turned out satisfactorily with the application of more or less heat in accordance with the material used. The fusibility of these bodies is in the order as given, the Close body needing to be fired for twenty minutes in the baking of a crown and the Downey not more than one minute, the others ranging between these. These differences can be taken advantage of by using the more refractory bodies for foundation and form and the ones more easily fused for finishing when this is desirable. While we do not wish to say that it is absolutely proven to be the case, some of the low fusing bodies seem to have much greater strength than has been ordinarily credited to them. It has been proven, for instance, that the Downey body, which fuses very readily even upon a high grade of gold, will withstand a greater crushing force than some of the more refractory porcelains in long use. We have been assured by the producers of this material that it will also withstand force applied in other ways as pulling and lateral force.

In the regulation gold and gold and porcelain crown and bridge work, the Hollingsworth system of caps and cusps have attained a decided popularity with many and even with those who do not adopt the method in its entirety, many useful hints can be obtained and worked with other methods.

Dr. Taggart assures your committee that he has demonstrated the fact that the ideal furnace is one in which electricity is used for developing the heat required. He has been able to thoroughly fuse the most refractory porcelains by connecting the furnace to an ordinary Edison incandescent circuit, obtaining heat enough in the muffle for any purpose without noise and without heating the exterior of the furnace beyond the point at which it can be comfortably handled. The advantages of such a furnace will be apparent to all. The ease with which the heat is obtained and regulated and the freedom from danger of gassing are features sufficiently important to guarantee this to be the coming furnace. It is to be regretted that Dr. Taggart has not brought this apparatus

before us, but it is gratifying to know that he has experimented to the extent of satisfying himself that the process is a practical one.

As a decidedly novel method of cleansing root canals must be mentioned the use of the liquid alloy of potassium and sodium introduced by Dr. Emil Schreier, of Vienna. I hope that the members of this society will give their experience with this material so as to compare results obtained which may enable each to use it to better advantage if it should be used on account of its merits, or discard it if it has proven a dangerous agent. The experience of some leads them to suspect that we are constantly in danger of exciting violent peridental inflammation about the roots of teeth in the canals of which this is used. An inflammation has been excited about the teeth so treated which seemed to indicate that a caustic action had extended beyond the foramen and while suppuration does not ensue the symptoms are very violent for several days. It does not seem out of place to mention again the oxyphosphate of copper which was included in the report of this committee two years ago as a novelty, while it is something of a novelty as yet, it has been used by a few to sufficient extent to arrive at its value. While it has been found to be unfit for some purposes for which it at first seemed eminently adapted, it has been proven to be immensely valuable for others so the history of three years' use should be profitable. Originally the peculiarities of the material seemed to indicate that it would be useful in crown setting as the best results could be obtained with this cement in a fluid state but while it worked very nicely the liquid would in many cases so cauterize the gum margin and peridental membrane as to preclude its use for this purpose. It has been found however that this cement is preëminently a decay arrester, or that it will seal up and arrest decay in the most desperate of cases and so act upon dentine or any tooth material with which it has been placed in contact, that even if the filling has wasted if such wasting takes place the tendency to distintegration has been done away with along with any sensitiveness that may have been present at the time of filling. It will adhere to the surface of a cavity of any shape and even if this surface is not as dry as we usually wish, the cement will flow satisfactorily and the moisture will be taken up in the crystallization. It has been placed into cavities with almost no preparation except the washing out of food débris and up to date after more than two years some such cases show no progress of decay. In

the open fissures of the teeth of young children this material can be placed without any cutting and absolutely prevent the progress of decay in teeth of this class treated in this way. During my early experience with the material there has been as yet no necessity of replacement and in the teeth of adults it has been used as a temporary stopping with almost no preparation on account of extreme sensitiveness and after a few months the cavities prepared satisfactorily the sensitiveness having been relieved to a marvelous extent. This cement in its preparation calls for manipulation so different from the zinc phosphates that unless I have an opportunity to demonstrate its use I refrain from recommending it, but when its peculiarities and its proper preparation are understood it can be made a valuable addition to any practitioner's list of filling materials.

In apparatus we have to offer a changeable angle hand piece, the invention of Dr. A. H. Peck. With it the bur can be propelled at three angles to the main shaft, viz., the acute, right and obtuse, combining three instruments in one and has been used by Dr. Peck and others long enough to demonstrate its practicability.

Also a handpiece for the engine, made by the Dental Protective Supply Company, which for compactness, simplicity and general construction seems to be the equal at least of any obtainable. Also a form of bur made by this company which is a little different in its form and arrangement of blades from anything before produced and which Dr. Crouse claims have advantages as cutters over any previous form.

Also a labial clamp made by Dr. Keefe, it being an improvement on the clamps offered a few years since by that gentleman. The improvement consists in the addition of removable and adjustable jaws, an extra jaw being furnished which enables the operator to satisfactorily adjust it to any size of tooth.

Also a sponge holder to be used on the dental engine handpiece, the invention of Dr. George E. Zinn. It is possible to adjust the sponge to different sizes of wheels upon which it is to be used.

Also an adjustable combination of mouth prop and mirror devised by Dr. D. M. Gallie. By its use the operator is given the use of both hands, having the mouth mirror held in the position where needed by means of the prop.

Also a root trimmer from the same source. This is in the form of forceps, one beak terminating in a sharpened hook, the

other in a blunt point to rest in the central cavity of the root to be trimmed. With this beak in position the hooked point is passed under the gum and by a closure and depression of the handles the enamel is easily cleaved off. This seems to be a most admirable instrument for trimming a considerable portion of the circumference of roots to be prepared for crowning.

DISCUSSION.

Dr. W. A. Stevens: I desire to present a little arrangement exhibited to me by Dr. Carmichael, of Milwaukee, for keeping your corundum wheels wet when using them in the mouth. I have shown it to several youths (laughter) of my age, and they said they had never seen or heard of it before. It is simply an old mouth glass with the glass broken out of it and a piece of sponge stuck in it with some shellac. That is all there is of it. You can wash it or lay it anywhere. I will pass it around. I think it is much handier than anything I have seen presented for moistening corundum wheels, costs nothing, and is clean.

With reference to Dr. Hollingsworth's method, I have been using it for over a year, and I like it very well for all of the back teeth. I have tried about eight or ten different methods of making crowns, but this one satisfies me the best of any I have used. I do not believe in it very much for the front teeth.

Dr. Grafton Munroe: I desire to say a few words with regard to sodium and potassium in the treatment of root canals. While at the World's Columbian Dental Congress I had the good fortune to see Dr. Schreier operate with his sodium potassium preparation, although it was not in a root that was in the mouth; at the same time I was imbued with the idea that it would be a good plan to try it. I came home with the determination and set to work, and have used two vials of it in my practice, and I find it is of great assistance in treating putrid root canals. Where I use it, I open the cavity leading to the canal as thoroughly as I can, and clean out as much of the bulbous portion of the nerve as is possible, and then having opened up the root canal well, so that the gases can escape, as soon as there is combustion, it makes it simpler and there is less danger of inflammation. Dr. Ames spoke of having periosteal inflammation in some cases. I must confess I am a new worker with it, but I have used it very cautiously. When I get down deep in the root, I first drop into it a little

peroxide of hydrogen, then partly dry out some of that with cotton and introduce my sodium and potassium again, and in that way, prevent danger of going through. I have found great benefit from it.

Dr. W. F. GREEN: I have used the sodium potassium preparation for a year, if not longer. I have used it in about one hundred cases, and with the exception of two or three cases in badly decayed roots—more properly speaking, "snags"—I have had no irritation whatever thus far. I have been in a position to see a number of the teeth so treated several times since, and they are in a perfect condition at the present time. I think a great deal depends upon the manner in which it is introduced into the canal. As Dr. Munroe says, if the canal is obstructed in the least and combustion takes place you must have an escape somehow, and like the Irishman's dose of medicine, it will work the other way.

REPORT OF THE SUPERVISOR OF CLINICS.

The Supervisor of Clinics respectfully begs leave to report as follows:

Dr. G. V. Black, of Jacksonville, gave an interesting and instructive talk on the excursion of the food, in chewing, along the surfaces of the teeth and gums, illustrating his remarks with a patient in the chair, in whose teeth he had previously placed contour fillings. The marginal lines of these fillings were so placed with reference to the friction brought about by the excursions of the food in chewing that they would always be cleaned, thereby preventing the recurrence of caries. The talk consisted of explanations and demonstrations of these excursion lines of food and lines of friction upon the several teeth with a study of the shaping of fillings so as to facilitate the cleaning of their marginal lines, and keeping clean the interproximate spaces in the several positions in the mouth.

Dr. C. W. Leake, of Chicago, inserted a large gold filling in a tooth set in the jaw of a dummy, for the purpose of demonstrating the use of the Harris pneumatic mallet in connection with an electric motor. The clinic was successful in demonstrating the efficiency of this method of condensing gold.

Dr. Edmund Noyes, of Chicago, demonstrated his method for root canal filling, by the use of Hill's stopping softened with eucalyptol and heat, which method, no doubt, is a successful one in his hands. But your committee is unable to discover any particular advantage of this method over the usual way, *i. e.*, the use of chloro-percha and gutta-percha points.

Dr. W. H. Taggart, of Chicago, exhibited specimens of crown and bridge work of his making, which, to the committee, seem to be more nearly perfect in every detail of construction than any other it has been our pleasure to examine. One piece, a permanent bridge, in which he used the English diatoric teeth for artistic effect of the porcelain in the occlusal surfaces, and utility of gold for strength. The facings not having been subjected to heat, but were cemented in place after the gold work of the bridge

was finished and before placing in the mouth. Crowns were exhibited, showing in detail the manner of constructing porcelain-faced crowns by riveting the facings in position after the gold work is finished, making a stronger crown than the solder cases because the facing has not been subjected to heat which causes hidden checks to form, thus weakening the porcelain. Also by his method a better surface is left on which to place another facing should the original one ever be broken, and there is no danger of changing the color of the facing by this process. Also porcelain crowns baked by means of an electric furnace, which was attached to a circuit of the incandescent system, the radiation of heat from this furnace being so slight that it can be comfortably held in the hand while the case is being baked.

The clinic of Dr. James W. Cormany, of Mt. Carroll, on the construction of a gold and amalgam substitute for the lingual cusp of a bicuspid was necessarily incomplete, because of the necessity for the operation of root canal filling. He could only demonstrate the shaping and fitting of the band.

Dr. George A. McMillen, of Alton, inserted a large filling in the occlusal surface of a molar tooth, using about five sheets of absolutely noncohesive gold No. 4, without the rubber dam. Insertion of gold occupying about five minutes. The filling having every appearance of having been thoroughly packed against the walls of the cavity, but there being no especial effort made to keep the cavity and gold dry, the future success of the operation is something of a question in the minds of the committee.

Dr. D. M. Cattell, of Chicago, on fillings of aluminum, tin, cohesive and noncohesive gold, used separately and in combination, was a decidedly unsuccessful combination in that he failed to materialize.

Dr. E. H. Allen, of Freeport, inserted a gold filling, using the Bonwill mechanical mallet in connection with an electric motor, which operation was a successful demonstration of said mallet.

Dr. P. H. Morrison, of St. Louis, inserted a filling on the incisal edge of an upper incisor, using only small pits for retention. As the filling receives the direct force of the lower teeth, it is the sense of the committee that this means of retention is hardly sufficient.

The "Demonstration of Crown and Bridge Work," by Dr. A.

W. Hebert, of Chicago, was rather an exhibition of his method of tipping porcelain facings, by which the natural shape of facing is retained.

Dr. S. Finley Duncan, of Joliet, prepared and filled the root canal of an upper incisor by the use of chloro-percha and gutta-percha cones, which operation no doubt will prove a success.

Dr. A. E. Matteson, of Chicago, exhibited a very compact and complete little furnace, heated by a gasoline blast.

The demonstration by Dr. W. V. B. Ames, of Chicago, on mixing of oxyphosphates on a chilled surface, to-wit—a large bottle with flat surfaces, filled with ice water, being the method of Dr. George Evans, clearly demonstrated the possibility of more thoroughly mixing and incorporating a larger quantity of the powder into the liquid than is possible when mixed by the ordinary methods.

Dr. C. N. Thompson, of Chicago, by special request of the committee, demonstrated by a practical case the construction of a porcelain crown by the Downey method. This system is comparatively a new one to the profession and is peculiarly adapted for the construction of clean, artistic work, especially for the anterior teeth.

Dr. Wm. W. Shryock, of Ft. Wayne, Ind., exhibited gold crowns on upper incisors of his little girl and boy, which were placed when the children were but two and three years of age respectively.

Your committee takes pleasure in making a further report on the condition of work, examined by them, which was done in the clinic of the society in years gone by.

A large gold filling in a mesio-occlusal cavity of an upper left first molar of Dr. Chas. R. Taylor, which was inserted by Dr. E. D. Swain, in 1881. Said filling being in excellent condition at the present time.

A large gold filling in a bucco-occlusal cavity of the lower right second molar of Dr. A. B. Clark, inserted by Dr. C. P. Pruyn in 1881. Said filling being in good condition at the present time.

An upper removable bridge in the mouth of Dr. James W. Cormany, which was made by Dr. W. H. Taggart, in 1889, is found to be in as serviceable condition as when first inserted, and in fact more so, if possible, because the roots, the upper cuspids and

right lateral which afford attachment for the bridge while in place, were quite loose at time of its insertion. The work having been so nicely adjusted that the roots have since tightened and are now as firm in their sockets as any of the other natural teeth.

In the mouth of Dr. W. F. Green, is a large gold filling in the disto-occlusal cavity of the upper right second bicuspid, which was inserted by Dr. C. N. Johnson, in 1892. The gum festoon in this case had been completely destroyed by the process of wedging. By the operation the interproximate space and contact point were so nearly perfectly restored to normality that the gum festoon has since been reproduced, and the operation, in all its details, seems to be in a perfect condition at the present time.

Respectfully submitted,

A. H. Peck, Supervisor of Clinic.
C. R. Taylor, Assistant.

DISCUSSION.

Dr. J. W. Cormany: I will say in regard to the bridge that Dr. Taggart made for me in 1889, it has given me most satisfactory service ever since. I do not know of anything that I have enjoyed and received as much comfort and pleasure from as I have from this bridge. All of the teeth back of the cuspids on the upper jaw were gone, and to those who are not acquainted with this bridge, I will say that it was made and inserted in 1889, and since that time it has not been repaired. It has remained in its place, given me good service, and I do not know that any superior method could be adopted for a bridge of this kind. Instead of telescoping over the cuspids there are spring pins that go into the gold tubes inserted within the teeth, and these springs of course become a little weak at times; perhaps once in six months I have to merely spread them apart just a trifle. That is all the attention or care they require. It is perfectly tasteless, and I never allow any accumulation of food of any kind to remain there any length of time, taking it out and putting it in whenever I think it is necessary to do so, making that much wear on the tubes. I remove it every night, wipe out the tubes with cotton and give it a thorough cleansing. I remove the bridge only once a day.

APPENDIX.

LIST OF OFFICERS

. . OF THE . .

ILLINOIS STATE DENTAL SOCIETY,

FROM DATE OF ORGANIZATION.

ORGANIZED AT CHICAGO, JULY 24, 1865.

CHAIRMAN, A. C. VAN SANT, PRINCETON. SECRETARY, E. HONSINGER, CHICAGO.

Ann'l meeting.	Year.	Place.	President.	Vice-President.	Secretary.	Treasurer.	Librarian.
1	1865[1]	Chicago.....1st.	A. C. Van Sant..Princeton.	E. Honsinger ...Chicago.	Edgar Park.....Chicago.	S. Babcock...Springfield.	T. N. Truesdell..... Elgin.
2	1866	Chicago.....2d.	H. N. Lewis.....Quincy.	O. Wilson.....Aurora.	G. T. Smith...Princeton.	M. W. Sherwood. Chicago.	L. P. Haskell.....Chicago.
3	1867	Chicago.....3d.	Geo. H. Cushing...Chicago.	A. W. French. Springfield	M. S. Dean.....Chicago.	J. N. Crouse..Mt. Carroll.	W. W. Allport.....Chicago.
4	1868	Springfield. 1st.	E. H. Kilbourne....Aurora.	G. P. Kingsley..Freeport.	H. J. Smith.....Quincy.	A. W. French..Springfield	M. S. Dean.....Chicago.
5	1869	Quincy.....1st.	M. S. Dean.....Chicago.	G. V. Black..Jacksonville.	C. S. Smith...Springfield.	A. W. French..Springfield	C. O. Dean..Mount Carroll.
6	1870	Bloomingt'n 1st	M. S. Dean[2].....Chicago.	G. V. Black[2]. Jacksonville	C. S. Smith[2]..Springfield.	A. W. French[2] Springfield	C. O. Dean[2], Mount Carroll.
7	1871[3]	Peoria.....1st.	G. V. Black ..Jacksonville.	S. C. Wilson. Bloomington	C. S. Smith...Springfield.	G. P. Kingsley..Freeport.	E. C. Stone.....Galesburg.
8	1872	Chicago....4th.	O. Wilson..... ...Aurora	J. N. Crouse.....Chicago.	C. S. Smith...Springfield.	G. P. Kingsley..Freeport.	J. M. Hurtt.....Peoria.
9	1873	Rock Island 1st	J. N. Crouse .....Chicago.	S. L. Edwards ....Peoria.	C. R. E. Koch....Chicago.	S. M. Sturgiss....Quincy.	J. M. Hurtt.....Peoria.
10	1874	Jacksonville 1st	C. Stoddard Smith. Spr'g'd	E. Honsinger....Chicago.	C. R. E. Koch....Chicago.	S. M. Sturgiss....Quincy.	R. Matthews.....Pontiac.
11	1875	Ottawa .....1st.	G. S. Mlies.....Jerseyville.	E. D. Swain.....Chicago.	C. R. E. Koch....Chicago.	C. A. Kitchen.....Galva.	F. W. Dean.....Pekin.
12	1876	Galesburg..1st.	E. D. Swain.....Chicago.	K. B. Davis, Petersburg.	C. R. E. Koch....Chicago.	C. A. Kitchen..Rockford.	O. Wilson.....Aurora.
13	1877	Springfield..2d.	K. B. Davis ....Springfield.	E. C. Stone....Galesburg.	E. D. Swain.....Chicago.	C. A. Kitchen..Rockford.	E. B. David.....Aledo.
14	1878	Rockford...1st.	C. R. E. Koch.....Chicago.	S. M. Sturgiss....Quincy.	E. D. Swain.....Chicago.	C. A. Kitchen..Rockford.	E. B. David.....Aledo.
15	1879	Peoria.....2d.	S. M. Sturgiss.....Quincy.	C. A. Kitchen, Rockford.	Edmund Noyes..Chicago.	E. C. Stone....Galesburg.	W. W. Ormsbee....Geneva.
16	1880	Bloomington 2d	C. A. Kitchen....Rockford.	J. Frank Mariner, Ottawa	Edmund Noyes..Chicago.	E. C. Stone....Galesburg.	G. H. Harrington..Delavan.
17	1881	Rock Island 2d	J. Frank Mariner..Ottawa.	J. A. W. Davis, Galesburg	Edmund Noyes..Chicago.	E. C. Stone....Galesburg.	G. H. Harrington..Delavan.
18	1882	Quincy.....2d.	A. W. Harlan.....Chicago.	W. T. Magill, Rock Island	Edmund Noyes..Chicago.	E. C. Stone....Galesburg.	H. H. Townsend...Pontiac.
19	1883	Decatur.....1st.	E. C. Stone.....Galesburg.	J. J. R. Patrick, Belleville	Edmund Noyes..Chicago.	E. S. Talbot.....Chicago.	H. H. Townsend...Pontiac.
20	1884	Springfield..3d.	Edmund Noyes....Chicago.	H. H. Townsend, Pontiac	J. W. Wassall[4]..Chicago.	J. Campbell..Blooming'n	W. B. Woodward.....Peoria.
21	1885	Peoria.....3d.	H. H. Townsend...Pontiac.	M. H. Patten, Springfield	J. W. Wassall[5]..Chicago.	C. R. Dwight....Danville.	J. W. Cormany..Mt. Carroll.
22	1886	Rock Island 3d.	T. L. Gilmer.....Quincy.	W. B. Woodward, Peoria.	J. W. Wassall[6]..Chicago.	C. B. Rohland.....Alton.	W. B. Ames.....Chicago.
23	1887	Jacksonville. 2d	W. T. Magill..Rock Island.	C. B. Rohland.....Alton.	J. W. Wassall[7]..Chicago.	T. W. Prichett. Whitehall	W. B. Ames.....Chicago.
24	1888	Cairo.....1st.	C. B. Rohland.....Alton.	Chas. Henry, Jackson'lle.	Garrett Newkirk. Chicago	T. W. Prichett. Whitehall	W. B. Ames.....Chicago.
25	1889	Quincy.....3d.	Geo. H. Cushing...Chicago.	J. J. Jennelle.....Cairo.	Garrett Newkirk. Chicago	T. W. Prichett. Whitehall	W. B. Ames.....Chicago.
26	1890	Springfield. 4th.	T. W. Prichett..Whitehall.	Kate C. Moody, Mendota.	Garrett Newkirk. Chicago	W. A. Stevens...Chicago.	D. M. Cattell.....Chicago.
27	1891	Bloomington 3d	Truman W. Brophy. Chicago	E. K. Blair.....Waverly.	Garrett Newkirk. Chicago	W. A. Stevens...Chicago.	F. H. McIntosh..Bloom'g'n
28	1892	Springfield. 5th.	W. H. Taggart...Freeport.	Garrett Newkirk. Chicago	Louis Ottofy.....Chicago.	W. A. Stevens...Chicago.	F. H. McIntosh..Bloom'g'n

[1] Two meetings were held in Chicago, July and November; all succeeding meetings were held in May.
[2] These officers held over from the previous meeting, no election being held at the close of meeting of 1869.
[3] The officers acting at this and succeeding meetings were elected and installed at the close of the previous meeting.
[4] Assistant Secretary, W. H. Taggart, Freeport.
[5] Assistant Secretary, P. J. Kester, Chicago.
[6] Assistant Secretary, P. J. Kester, Chicago.
[7] Assistant Secretary, Louis Ottofy, Chicago.

LIST OF OFFICERS OF THE ILLINOIS STATE DENTAL SOCIETY.—Continued.

Ann'l meeting.	Year.	Place.	President.	Vice-President.	Secretary.	Treasurer.	Librarian.
29	1893	Rock Isl'd..4th	E. K. Blair.....Waverly.	C. N. Johnson...Chicago.	Louis Ottofy....Chicago.	W. A. Stevens...Chicago.	F. H. McIntosh, Bloom'g'n
30	1894	Springfield..6th	Garrett Newkirk..Chicago.	J.W.Cormany.Mt.Carroll	Louis Ottofy....Chicago.	W. A. Stevens...Chicago.	F. H. McIntosh, Bloom'g'n
31	1895	Galesburg...2d	J. W. Cormany.Mt. Carroll.	S. F. Duncan.....Joliet.	Louis Ottofy....Chicago.	W. A. Stevens...Chicago.	Grafton Munroe, Spring'ld
32	1896						
33	1897						
34	1898						
35	1899						
36	1900						
37	1901						
38	1902						
39	1903						
40	1904						
41	1905						
42	1906						
43	1907						
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63	1927						
64	1928						
65	1929						
66	1930						
67	1931						
68	1932						
69	1933						

OFFICERS AND STANDING COMMITTEES.

OFFICERS, 1894-95—GALESBURG.

President, J. W. CORMANY.....Mt. Carroll.
Vice President, S. F. DUNCAN.....Joliet.
Secretary, LOUIS OTTOFY .....Chicago.
Treasurer, W. A. STEVENS.....Chicago.
Librarian, GRAFTON MUNROE.....Springfield.

EXECUTIVE COUNCIL, 1894-95.

Ex Officio..... { J. W. CORMANY, Mt. Carroll. / LOUIS OTTOFY, Chicago. / W. A. STEVENS, Chicago.

Terms expire 1895..... { J. J. JENNELLE, Cairo. / E. M. ROBBINS, Carthage. / E. C. STONE, Galesburg.

Terms expire 1896..... { E. K. BLAIR, Waverly. / C. N. JOHNSON, Chicago. / S. F. DUNCAN, Joliet.

Terms expire 1897..... { GEO. H. CUSHING, Chicago. / E. H. ALLEN, Freeport. / A. S. WALTZ, Decatur.

STANDING COMMITTEES.

EXECUTIVE COMMITTEE.

A. H. PECK, Chairman.....Chicago.
J. M. BARCUS.....Carlinville.

COMMITTEE ON PUBLICATION.

LOUIS OTTOFY, Chairman.....Chicago.
A. W. HARLAN.....Chicago.
E. NOYES.....Chicago.

BOARD OF EXAMINERS.

E. D. Swain (term expires 1895).....Chicago.
C. B. Rohland " 1896).....Alton.
T. W. Prichett " 1897).....Whitehall.

COMMITTEE ON DENTAL SCIENCE AND LITERATURE.

A. W. Harlan.....Chicago.

COMMITTEE ON DENTAL ART AND INVENTION.

J. Frank Mariner.....Chicago.

COMMITTEE ON INFRACTIONS OF THE CODE OF ETHICS.

S. A. Campbell.....Mattoon.
D. E. Coulson.....Galesburg.
W. E. Holland.....Jerseyville.

CLINICS.

C. R. Taylor, Supervisor. .....Streator.
W. A. Johnston, Assistant.....Peoria.
P. J. Kester, Assistant.....Chicago.

LOCAL COMMITTEE OF ARRANGEMENTS.

E. C. Stone, Chairman.....Galesburg.
J. A. W. Davis.....Galesburg.
D. E. Coulson.....Galesburg.

CONSTITUTION AND BY-LAWS.

ARTICLE I.

Name.

This Society shall be called "The Illinois State Dental Society."

ARTICLE II.

Aims and Objects.

Its aims and objects are as follows: The elevation of the standard of professional education; the advancement and cultivation of dental science and literature, and the protection of the public from the evils of empiricism; the promotion of the honor, usefulness and interest of the dental profession and mutual fellowship and good feeling.

ARTICLE III.

Officers.

The officers of this Society shall consist of a President, Vice President, Secretary, Treasurer and Librarian, and such others as may be designated in the by-laws or standing resolutions.

ARTICLE IV.

Executive Council.

The management of this Society shall be vested in an Executive Council consisting of twelve active members of whom the President, Secretary and Treasurer shall constitute a part, and these shall be the officers of the Council.

ARTICLE V.

Duties of Executive Council—Election of President and Vice President. Appointment of all Other Officers, and Selecting Place of Next Meeting.

The Executive Council shall have exclusive control of all the business of the Society and their action shall be final, without review by the Society, except as otherwise provided.

At the morning session of the last day of the annual meeting the Society shall proceed to elect a President and Vice President by ballot. The first ballot shall be informal, and in no case shall a ballot be dispensed with.

The Council shall appoint or elect all other officers, and standing committees, and shall select the place of annual meeting. In case of the absence from the meeting of the President and Vice President or of any other officers, the Council shall appoint others to act in their places.

ARTICLE VI.

Election of Executive Council.

At the first election of the Executive Council held under the amended constitution, nine members shall be elected, who shall serve—three for one year—three for two years—and three for three years—their terms to be decided by lot after their election. At each subsequent annual meeting three members of the Council shall be elected by the Society to serve for three years.

ARTICLE VII.

Quorum.

Seven members of the Executive Council shall be necessary to constitute a quorum. If at any annual meeting a quorum should fail to be present, the members of the Council present shall appoint enough members of the Society to constitute with themselves a quorum, who shall serve until the arrival of the regular members of the Council.

ARTICLE VIII.

Members.

Section 1.—This Society shall consist of Active, Corresponding and Honorary Members.

Active Members.

Sec. 2.—The Active members shall consist of practitioners of dentistry residing in the State of Illinois (except as provided in Section 5, Article VII, of the By-Laws). They shall be twenty-one years of age, of good moral character, and shall have received a diploma from a respectable Medical or Dental College, or shall have been engaged three years in the practice of dentistry, including term of pupilage, and shall have passed a satisfactory examination before the Board of Examiners.

Corresponding Members.

Sec. 3.—Corresponding Members shall consist of practitioners of dentistry or medicine residing in this or other States of the Union, or in foreign countries, who manifest a disposition to advance the science and art of the profession by contributing to its literature.

Honorary Members.

Sec. 4.—Honorary Members shall consist of persons who have made valuable contributions to the science or art of dentistry, or have rendered important services to the profession.

ARTICLE IX.

Powers.

The Society shall use one common seal, with such device and inscription as it shall agree upon; and may, by vote of the Council, grant to its members such certificates as may authenticate their membership.

ARTICLE X.

Amendments.

The Constitution may be altered or amended, with the consent of two-thirds of the members of the Society present—the proposition stating the amendment (in writing) to be submitted by five members at an annual meeting and to lie over until the next annual meeting.

If the purpose and scope of such alterations or amendments be announced in writing at the annual meeting, or, if a general revision is desired to be made, and the society, or its executive council, shall appoint a committee to determine the details of such amendments, or to make such revision, the publication in the "Transactions" of such changes as are proposed to be made, or of such revised constitution, shall be deemed a sufficient compliance with the requirements of this section, and such proposed alterations, amendments, or revision, may be adopted or rejected at the next annual meeting thereafter.

BY-LAWS.

ARTICLE I.

OFFICERS.

Duties of the President.

Section 1.—The President shall preside at all meetings of the Society and Council, call special meetings of the Society at the request of ten active members, and of the Council at the request of three of its members; sign all diplomas, certificates, or letters testimonial; appoint all committees not otherwise provided for, and be *ex officio* a member of all standing committees.

Duties of the Vice President.

Sec. 2.—The Vice President shall, in the absence of the President, preside; and in case of the absence of both of these officers, a President *pro tempore*, shall be appointed by the Council.

Duties of the Secretary.

Sec. 3.—The Secretary shall keep minutes of all meetings, both of the Council and Society; notify officers and members of their election; give notice to members of all meetings; sign all diplomas, certificates and letters testimonial; receive all moneys due the Society from its members, and pay the same to the Treasurer, and certify to all official acts of the Society in connection with the President. He shall take charge of and conduct the correspondence of the Society, and shall keep a copy of all official letters he may write, with replies to the same. He shall be Chairman of the Publication Committee, and shall give a bond in amount as required by the Executive Council before entering upon his duties.

Duties of the Treasurer.

Sec. 4.—It shall be the duty of the Treasurer to keep all moneys of the Society committed to his trust; to pay them over by order of the President, countersigned by the Secretary, and keep a correct account of the same in a book pro-

vided for that purpose He shall make a full and detailed report of the financial affairs of the Society at the annual meeting each year; and at the expiration of his term of office, he shall deliver to his successor all funds, papers and books relating thereto, and shall give bond in amount as required by the Executive Council before entering upon his duties.

Duties of the Librarian.

Sec. 5.—The Librarian shall have charge of all books and manuscripts belonging to the Society. He shall keep an accurate catalogue of the same, and shall report at the annual meeting the condition of the Library, and contributions made to it during the year.

Publication Committee.

Sec. 6.—The President shall appoint annually, after the election of officers, two members of the Society, who shall act in conjunction with the Secretary, as the Publication Committee.

They shall be authorized to employ a competent reporter to furnish an accurate report of the proceedings of each meeting.

They shall superintend the publication and distribution of such portions of the Transactions as the Council may direct, or the committee judge to be of sufficient value, and shall have full authority and power to cut down, amend or leave out such matter as they deem best for the proper preparation of the Transactions for publication.

They shall specify, in their annual report, the character and cost of the publications of the Society during the year, and the number of copies still on hand. Any report or other paper entitled to publication in the volume of the Transactions for the year in which it shall be presented to the Society must be placed in the hands of the Publication Committee on or before the last day of the annual meeting, and must be also so prepared that the proof sheets furnished the authors shall be returned without material alteration or addition.

Every paper received by this Society, and all plates and other means of illustration, shall be considered the exclusive property of the Society, and shall be published for its benefit.

Disclaimer.

This committee is hereby instructed to print, at the beginning of each volume of the Transactions, the following disclaimer, *viz.*; "The Illinois State Dental Society, although formally accepting and publishing the reports of the various committees, and the essays read before it, holds itself wholly irresponsible for the opinions, theories, or criticisms therein contained, except when otherwise decided by special resolution."

ARTICLE II.

Election of the Executive Council.

At the election held first after the adoption of this amended Constitution, nine persons shall be chosen by the Society for members of the Executive Council, to serve for terms of one, two and three years respectively, or until their successors are duly qualified, and thereafter three members shall be elected annually to serve three years.

They shall be nominated with special reference to their fitness by a committee of three, to be appointed by the President, and only confirmed by a two-thirds affirmative vote of the members of the Society present.

The election of new members of the Council annually shall be held on the morning of the last day's session, but those newly elected shall only enter upon their duties after the close of the annual meeting at which they were elected.

ARTICLE III.

Duties of Executive Council.

The Executive Council shall have the absolute control of the entire business of the Society—and shall sit with closed doors.

How Business Shall be Brought Before the Council.

Any member of the Society desiring to bring any matter of business before the Council must do so in writing, and may appear before them to advocate any such measure by consent of the Council.

Whom They Shall Elect and Appoint.

They shall annually elect a Secretary, Treasurer and Librarian and appoint one member of the Executive Committee, one member of the Board of Examiners, a Committee of three on Ethics, a Supervisor of Clinics, a member of the committee on Dental Science and Literature, a member of the Committee on Dental Art and Invention and a Local Committee of Arrangements.

Officers and Members of Old Committees to Hold Over.

The officers of the Society and the members of the Executive Committee, of the Board of Examiners and of the Committee on Dental Science and Literature and of Dental Art and Invention who are in office at the time this constitution goes into effect shall continue in office till their full terms expire.

Auditing Committee.

The Executive Council shall annually appoint an Auditing Committee from their own number.

How Moneys Shall be Voted.

They shall vote no moneys to be paid for other than the legitimate expenses of the Society except upon a three-fourths vote of all the members of the Council present.

Presiding Officer not to Vote Except in Case of a Tie.

The presiding officer of the Council shall not vote on any question, except in case of a tie, when he shall cast the deciding vote.

ARTICLE IV.

Duties of Executive Committee.

The Executive Committee shall provide a suitable hall for meetings and prepare the program of scientific work and order of business for each annual session, and attend to such other business as the Council may direct.

ARTICLE V.

Duties of Board of Examiners.

The Board of Examiners shall satisfy themselves by examination, or in any other manner they may think necessary, of the reputable character and professional qualifications of all candidates for membership, and recommend for election such as they find to be worthy.

ARTICLE VI.

Vacancies in the Board of Examiners.

In case of the absence from any meeting of one or more members of the Board of Examiners, the Council shall appoint substitutes to act *pro tempore*, and in case of a vacancy, occurring by death or otherwise, they shall, at the earliest time practicable thereafter, appoint some member to fill the unexpired term of such vacating member.

ARTICLE VII.

Election of Members.

Section 1.—Candidates for membership must be proposed to the Board of Examiners, recommendations for the same being made in writing by two members of the Society, accompanied by the initiation fee, said fee being returnable to the applicant in case of rejection. The Board shall proceed to examine such candidates in accordance with the provisions of Article V. of these By-Laws, as early thereafter as practicable. Three-fourths of all the votes cast by the Council shall be necessary for the election of a member.

Sec. 2.—No person shall be entitled to the privileges of active membership until he shall have signed the Constitution and paid the initiation fees and dues. If he omit the same for one year his election shall be void.

Sec. 3.—No person having once been a member of this Society who has forfeited his membership by the nonpayment of his dues, shall be eligible to reëlection until the amount due from him at the time he was dropped be paid.

The names of all candidates recommended by the Board of Examiners for active membership shall be posted conspicuously in the room where the Society meets, and shall not be voted on until the daily session of the Council next following the posting.

Any member of the Society knowing of any reason why a candidate for membership should be rejected, shall notify the Board of Examiners and the Council through its presiding officer, in writing of such reasons.

Any candidate for membership who has once been voted upon and rejected, shall not have his name proposed again until the next annual meeting.

Corresponding and Honorary Members—How Elected.

Sec. 4.—The names of candidates for Corresponding or Honorary membership shall be presented to the Board of Examiners only upon the recommendation of ten active members.

The Board shall recommend them for election only after satisfying themselves that they have the qualifications provided for in Secs. 3 and 4, Article VIII.

of the Constitution ; and such names shall upon no occasion be presented to the Council, except by the Board of Examiners, who shall, in reporting names for Corresponding or Honorary membership, state what work the candidates have done entitling them to be so presented.

If any Corresponding member shall enter upon the practice of dentistry in this State, his corresponding membership shall thereupon cease.

Active Members Removing from the State.

Sec. 5.—Active members removing from the State may retain their membership by notifying the Secretary of their desire to do so and by regularly paying their dues.

ARTICLE VIII.

Initiation Fee and Annual Dues.

Section 1.—The initiation fee shall be five dollars. The annual dues shall be five dollars, payable in advance, on the morning of the first day's session of the annual meeting. No member shall be entitled to the privileges of the floor until his dues are paid. Any member who neglects to pay his annual dues two successive years, shall cease to be a member without action of the Society, *provided* the Secretary has notified him of his indebtedness.

What Members are or may be Exempt from Dues.

Corresponding and Honorary members shall be exempt from the payment of all dues; and as a mark of honor for distinguished services in the profession, by special action of the Society, the dues of an active member may be remitted. An active member having paid annual dues for twenty-five consecutive years, shall be constituted a life member, and shall be exempt from payment of dues.

ARTICLE IX.

Duties and Privileges of Members.

Section 1.—An active member shall not accept a student for a less period than three years, and shall require each student to give a written obligation to graduate at some regularly organized dental college before he assumes the responsibilities of a dental practitioner.

Sec. 2.—Active members shall be entitled to debate and vote on all questions discussed in the Society, and eligible to any office in its gift, provided their dues are fully paid.

Sec. 3.--Corresponding and Honorary members shall be entitled to a seat in meetings of the Society, and have the privilege of debating all questions of a professional or scientific character.

ARTICLE X.

Resignation or Expulsion of Members.

Section 1.—Any member shall have leave to resign (except in cases of impeachment), upon application made therefor in writing; *provided* all arrears due from him to the Society have been discharged.

SEC. 2.—Any member may be impeached by three members, for violating the laws of this Society, for malpractice, or other gross misconduct. All charges shall be made in writing with specifications, clearly setting forth each violation of the code of ethics governing this body. The member so impeached shall have transmitted to him a written copy of the impeachment, with notice of the time of hearing, before a committee of five members appointed for that purpose; then if the report of said committee sustain such impeachment, the Council, at the next regular meeting, may, by ballot, suspend or expel such member, by a majority of three-fourths of all the votes cast.

COMMITTEE ON ETHICS.

SEC. 3.—There shall be appointed annually, by the Executive Council, a Committee on Ethics, to consist of three members, to whom all complaints shall be submitted, and through whom alone shall cases of infractions of the code be brought before the Council.

ARTICLE XI.

No member shall speak on any question unless his dues are paid, and until his name has been announced by the presiding officer, nor shall any one speak more than twice upon one subject, nor to exceed fifteen minutes in all, unless by affirmative vote of the Society.

ARTICLE XII.

ANNUAL MEETINGS.

SECTION 1.—The annual meeting shall be held in May, commencing on the second Tuesday at 10 o'clock A. M., and shall be devoted to the reading and discussion of papers and such other business as shall relate to the interests of the profession, concluding with the election of officers during the last daily session. Ten active members shall be necessary to constitute a quorum for the transaction of business at any meeting of this Society.

The Executive Council shall meet at 9 o'clock A. M., preceding the meeting of the Society, and shall hold a session before each daily session of the Society if necessary. They may be called together at any time during the year by the President, upon the request of three members of the Council.

SEC. 2.—None but members of this Society shall be present during elections; *provided* an active member of the Society calls for the enforcement of this section.

SEC. 3.—It shall be the duty of the Society at each regular meeting, to appoint one of its members to deliver an address at the next regular meeting.

ARTICLE XIII.

ALTERATIONS OR AMENDMENTS.

SECTION 1.—These By-Laws may be altered or amended at any regular meeting by a vote of two-thirds of the members of the Society present, *provided* said alteration or amendment shall have been presented at a previous meeting.

If the purpose and scope of such alterations or amendments be announced in writing at the annual meeting, or, if a general revision is desired to be made, and

the society, or its executive council, shall appoint a committee to determine the details of such amendments, or to make such revision, the publication in the "Transactions" of such changes as are proposed to be made, or of such revised By-Laws, shall be deemed a sufficient compliance with the requirements of this section, and such proposed alterations, amendments, or revision, may be adopted or rejected at the next annual meeting thereafter.

ARTICLE XIV.

Rules of Order.

Robert's Rules of Order shall be the Code of this Society.

ARTICLE XV.

This Constitution shall go into effect immediately upon its adoption, and it shall be the duty of the presiding officer at once to appoint a Nominating Committee, as provided in Article II. of the By-Laws, and said committee shall as soon thereafter as possible present the names of the Executive Council, and the vote be then immediately taken.

STANDING RESOLUTIONS.

Supervisor of Clinics.

Resolved, That a Supervisor of Clinics shall be appointed annually by the Executive Council to serve one year.

The duties of such Supervisor shall be to make all arrangements for the holding of clinics, to have charge of the clinic rooms, fixtures, etc., and to determine who may or may not operate, what operations shall be performed, etc., etc. He shall keep a record of all operations in a book provided for that purpose, and shall report to the Society annually at the second daily session after the holding of the clinics.

His report shall contain as thorough a criticism of each operation as possible, setting forth all the steps he may have deemed incorrect or otherwise, a statement of what he would have thought a better method, and his reasons therefor—to the end that profitable and instructive discussion may follow. He shall also report, as far as possible, the condition of operations made at the clinics of previous years.

He may appoint one or more assistants, as may be required.

He shall notify each clinical operator to supply himself with all needed instruments and appliances for the proper performance of his operations, and request him to select for himself an assistant.

Alternates shall also be selected and notified.

Duties of Librarian.

Resolved, That after this date (May 1885), it shall be the duty of the Librarian to obtain cabinet photographs, so far as possible, of all the members of this Society deceased. and likewise of the present members, and to properly arrange the

same in suitable albums to be procured by him; and the photographs of future members shall be added to the collection.

The Librarian shall be the custodian of these albums, and shall bring them to each annual meeting for the inspection of the members.

Resolved, That the following Committees be created :

COMMITTEE ON DENTAL SCIENCE AND LITERATURE.

First, a Committee consisting of one member on Dental Science and Literature, whose duty it shall be to report annually, on the first day of the annual meeting, on the progress of science and literature as appertaining to dentistry and give a resumé of all that may be new and important.

COMMITTEE ON DENTAL ART AND INVENTION.

Second, a Committee consisting of one member on Dental Art and Invention, whose duty shall be to report on the first day of each annual meeting, the advance made during the year in the arts and inventions appertaining to dentistry. This Committee shall exhibit the new devices and methods pertaining to the practice of dentistry, which are brought before the Society, in a room specially provided for that purpose.

The member of this committee shall be selected with reference to his special fitness for those duties, and be appointed by the Council.

The term of office shall be one year.

DISTRIBUTION OF TRANSACTIONS.

Resolved, That the official transactions shall not be supplied to members in arrears for annual dues; but it shall be the duty of the Secretary to notify all delinquents of this action previous to the publication of the transactions.

Resolved, That the members of the Publication Committee shall have the power to make such arrangements as in their judgment they deem proper looking toward the publication of the transactions for the succeeding year.

CODE OF ETHICS.

ARTICLE I.

SECTION 1. The dentist should be ever ready to respond to the reasonable wants of his patrons, and should fully recognize the obligations involved in his duties toward them. As, in many cases, they are unable to comprehend the operation or service performed, or to correctly estimate its value, the practitioner must be guided by his own sense of right, in treating the case as his superior knowledge dictates. His manner should be gentle and sympathetic, and yet sufficiently firm to enable him to secure the best results of his skill. He should gain the confidence of his patrons, not alone by the skillful performance of difficult operations, but also by attending carefully and conscientiously to the simpler cases committed to his care.

SEC. 2. The dentist, without being obtrusive or pedantic, should impart such information to his patrons as his opportunities afford him in regard to the causes and nature of the disease in the teeth, or adjacent parts, which he may be called upon to treat; and should explain to them the importance of availing them-

selves of such timely preventives or remedies as he may deem necessary to their welfare. He should also communicate such general information as shall enable them to exercise an intelligent appreciation of what the profession aims to accomplish.

SEC. 3. The dentist shall be temperate in all things, keeping both mind and body in the best possible health, that his patients may have the benefit of that clearness of judgment and skill which they have a right to expect.

ARTICLE II.

SECTION 1. Every member of the dental profession is bound, as such, to maintain the honor and integrity of the profession. To this end, he should himself be upright and courteous in his intercourse with the public and his brethren in the profession.

SEC. 2. It is unprofessional to resort to public advertisements, such as cards, handbills, posters or signs calling attention to peculiar styles of work, prices for services, special modes of operating, or to claim superiority over neighboring practitioners; to publish reports of cases, or certificates in the public prints; to go from house to house soliciting or performing operations; to circulate or recommend nostrums, or to perform any other similar acts. But nothing in this section shall be so construed as to imply that it is unprofessional for dentists to announce in the public prints, or by card, simply their names, occupation, and place of business; or in the same manner to announce their removal, absence from, or return to business; or to issue, to their patients appointment cards, with a fee bill for professional services thereon.

SEC. 3. The dentist, when applied to, for merely advice or temporary relief, by the patient of a reputable practitioner, whose services at that time he is unable to procure, should guard against disparaging the family dentist by hints, inquiries, or any other means calculated to weaken the patient's confidence in him. At the same time the dentist should not, from too high a sense of professional courtesy to his neighboring practitioner, allow the interests of persons so applying for counsel or service, to be jeopardized.

SEC. 4. And it shall be regarded as unprofessional to warrant operations or work as an inducement to patronage.

ACTIVE MEMBERS, 1894.

NAME.	ADDRESS.	ELECTED.
ALLEN, E. H.*	Freeport	1883
AMES, W. V. B.*	34 Washington St., Chicago	1884
ANTES, R. H.	Geneseo	1873
BAKER, HESTER J.*	Quincy	1894
BALDWIN, A. E.	828 West Adams St., Chicago	1887
BANES, J. D.	65 Randolph St., Chicago	1891
BARCUS, J. M.*	Carlinville	1889
BECKWITH, T. W.	Sterling	1881
BLACK, G. V.* *Life Member*	Jacksonville	1868
BLAIR, E. K.*	Waverly	1887
BRIGHAM, E. T.	Watseka	1889
BROPHY, T. W.,*	126 State St., Chicago	1876
BROWN, A. E.	1911 Michigan Ave., Chicago	1882
BROWN, J. B.,*	Bloomington	1892
BULL, H. B.,*	Fairbury	1892
CALL, E. B., *Life Member*	Peoria	1870
CAMPBELL, J.*	Bloomington	1875
CAMPBELL, S. A.,*	Mattoon	1886
CARSON, C. W.	3872 Cottage Grove Ave., Chicago	1892
CASE, C. S.,*	126 State St., Chicago	1894
CATTELL, D. M.	34 Monroe St., Chicago	1889
CHAPPELL, O. A.	Elgin	1887
CHILDS, T. S.,*	Decatur	1894
CHRISTMANN, G. A.	95 Fifth Ave., Chicago	1881
CIGRAND, B. J.	475 West North Ave., Chicago	1893
CLARK, A. B.,*	34 Washington St., Chicago	1876
CLUSMANN, L.	360 Blue Island Ave., Chicago	1892
COLLINS, J. W.*	Lincoln	1883
COOK, GEO. W.*	131 53d St., Chicago	1894
CORBETT, C. C.*	Edwardsville	1892
CORMANY, J. W.*	Mt. Carroll	1878
COSTNER, H. A.*	5 43d St., Chicago	1892
COULSON, D. E.*	Galesburg	1890
CRISSMAN, IRA B.*	271 North Clark St., Chicago	1890
CROUSE, J. N.* *Life Member*	2231 Prairie Ave., Chicago	1865

*Present.

Name.	Address.	Elected.
Cummins, J. T.	Metropolis City	1888
Curry, A. J.	Streator	1892
Cushing, G. H.* *Life Member*	31 Washington St., Chicago	1865
Damron, G. H.	Arcola	1892
David, E. B.*	Aledo	1873
Davis, J. A. W.*	Galesburg	1872
Davis, K. B.* *Life Member*	Springfield	1869
Davis, L. L.*	524 West Van Buren St., Chicago	1885
Dayan, L. F.	118 53d St., Chicago	1885
Daymude, O. M.*	Monmouth	1893
Dennis, G. J.*	257 31st St., Chicago	1890
Dickson, J. G.	Carmi	1888
Dillon, G. B.	Sterling	1886
Dorn, C. P.	Naperville	1880
Duncan, E.*	Jacksonville	1877
Duncan, S. F.*	Joliet	1881
Dunn, J. Austin*	70 Dearborn St., Chicago	1887
Eiles, F. Stanley*	Blue Island	1893
Entsminger, G. W.	Carbondale	1888
Evey, D. H.*	Monmouth	1894
Fischer, Vincent	570 Blue Island Ave., Chicago	1892
Fishburn, J. M.	El Paso	1884
Fisher, J. W.*	Bloomington	1876
Fitch, H. H.	Pekin	1883
Freeman, A. B.	580 West Madison St., Chicago	1889
Freeman, A. W.* *Life Member*	34 Washington St., Chicago	1865
Freeman, D. B.	4000 Drexel Boulevard, Chicago	1872
Freeman, I. A.	103 State St., Chicago	1885
Gallie, Don M.*	185 West Madison St., Chicago	1894
Gardiner, F. H.	31 Washington St., Chicago	1877
Gardner, T. D.	Quincy	1889
Gilmer, Thos. L.*	126 State St., Chicago	1872
Gluesing, J. W.	Moline	1893
Goebel, Robert*	Lincoln	1884
Goodmanson, J. Sydney	Tiskilwa	1893
Gordon, Byron	Moline	1893
Green, W. F.*	South Evanston	1892
Griffith, P. R.*	Bloomington	1891
Guffin, E. L., *Life Member*	Geneseo	1882
Gunther, H. Alfred	3300 Cottage Grove Ave., Chicago	1892
Hanaford, M. L.	Rockford	1878
Harlan, A. W.*	Masonic Temple, Chicago	1872
Harper, W. E.	3500 State St., Chicago	1893
Harris, A. J.	279 Warren Ave., Chicago	1886
Hebert, A. W.*	31 Washington St., Chicago	1894

*Present.

NAME.	ADDRESS.	ELECTED.
HELM, C. B.	Rockford	1893
HENRY, CHAS * *Life Member*	Jacksonville	1868
HILTON, JOHN	Freeport	1893
HINKINS, J E.*	131 53d St., Chicago	1888
HOLLAND, W. E.*	Jerseyville	1889
HONSINGER, E., *Life Member*	318 Park Ave., Chicago	1865
HOWE, A. O.	70 State St., Chicago	1891
HUNTER, H. L.*	Clinton	1892
JAMES, CHAS. W.*	Oak Park	1894
JENNELLE, J. J.	Cairo	1887
JOHNSON, C N.*	31 Washington St , Chicago	1886
JOHNSTON, W. A.*	Peoria.	1891
KEEFE, J. E.	34 Washington St., Chicago	1888
KESTER, P. J.	126 State St., Chicago	1882
KITCHEN, C. A., *Life Member*	Rockford	1865
KOCH, C. R. E.,* *Life Member*	213 31st St., Chicago	1867
LAMBERT, EDMUND	Springfield	1890
LAURANCE, R. N.*	Lincoln	1879
LEAKE, C. W.*	2454 Indiana Ave., Chicago	1894
LECRON, D. O. M.*	Rockford	1892
LECRON, S. L.*	Springfield	1891
LUMPKIN, I. A.	Mattoon	1886
MAGILL, W. T.*	Rock Island	1871
MARINER, J FRANK	Lake Ave. and 43d St., Chicago	1872
MARSHALL, J. S.	34 Washington St., Chicago	1883
MARTIN, W. C.	Peoria	1881
MATTESON, A. E * *Life Member*	3700 Cottage Grove Ave., Chicago	1869
MATTESON. C. F.	50 35th St., Chicago	1872
MEERHOFF, C. E.	1603 North Clark St., Chicago	1891
MERRIMAN, CHAS. J.	31 Washington St., Chicago	1891
MUNROE, GRAFTON*	Springfield	1890
MCCANDLESS, A. H.	Rock Island	1892
MCCANDLESS, A. W.	126 State St., Chicago	1892
MCINTOSH, F. H.*	Bloomington	1884
MCMILLEN, GEO. A *	Alton	1891
NELSON, NELS.	230 Milwaukee Ave., Chicago	1882
NEWKIRK, GARRETT*.	31 Washington St., Chicago	1880
NEWSOME, B *	Minonk	1894
NOYES, EDMUND*	65 Randolph St., Chicago	1892
NYMAN, J. E.*	34 Washington St., Chicago	1894
OAKEY, A. J.	63d St. and Stewart Ave., Chicago	1892
ORMSBEE, W. W., *Life Member*	Geneva	1865
OTTOFY, LOUIS*	Masonic Temple, Chicago	1881
PALMER, BYRON S	631 Washington Boul., Chicago	1889
PATRICK, J. J. R.	Belleville	1881

*Present.

NAME.	ADDRESS.	ELECTED.
PEARCE, R. M.	Rock Island	1891
PECK, A. H.*	65 Randolph St., Chicago	1890
PERRY, E. J.	Tacoma Building, Chicago	1890
PFEIFER, JOSEPHINE D.*	Masonic Temple, Chicago	1894
PHILLIPS, L. T.	Nashville	1883
PLACE, E. H.	Freeport	1891
POWELL, C. B.*	Jacksonville	1894
PRICHETT, T. W.*	Whitehall	1877
PRICKETT, H. M.*	Springfield	1890
PRIESTMAN, W. H.	Pontiac	1883
PRIMROSE, F.*	Springfield	1892
PRUYN, C. P.	70 Dearborn St., Chicago	1876
RAYBURN, J. R.*	Fairbury	1890
REID, J. G.	126 State St., Chicago	1882
RICE, S. T.	Barry	1894
RICHARDS, W. P.	257 Evanston Ave., Chicago	1886
ROBBINS, E. M.*	Carthage	1882
ROBERTS, BENJ. J.	516 Lincoln Ave., Chicago	1890
ROBERTS, N. J.	Waukegan	1886
ROBINSON, S. G.	58 43d St., Chicago	1892
ROHLAND, C. B.*	Alton	1874
ROSS, F. R.	3904 Indiana Ave., Chicago	1891
ROYCE, E. A.	721 Washington Boul., Chicago	1886
SALOMON, G. S.	Masonic Temple, Chicago	1885
SALTER, G. B.*	31 Washington St., Chicago	1871
SAWYER, C. B.*	Jacksonville	1887
SCHUHMANN, H. H.	103 State St., Chicago	1892
SITHERWOOD, G. D.*	Bloomington	1880
SKIDMORE, L. W.*	Moline	1891
SLYFIELD, G. H.	Waukegan	1887
SMITH, GILMAN T.	Princeton	1885
SMITH, T. H.	Bloomington	1891
SPRINKLE, J. M.	Nokomis	1893
STALEY, H. REID*	Lanark	1894
STEVENS, W. A.*	2361 Wabash Ave., Chicago	1876
STEWART, E. H.	Joliet	1890
STONE, E. C.* *Life Member*	Galesburg	1866
STOVER, F. G.	Rockford	1893
SWAIN, EDGAR D.* *Life Member*	65 Randolph St., Chicago	1867
SWARTZ, M. W.	Peoria	1882
SWASEY, J. A.	3017 Michigan Ave., Chicago	1876
TAGGART, W. H.*	Masonic Temple, Chicago	1880
TAYLOR, C. R.*	Streator	1880
THAYER, C. H.	3302 Indiana Ave., Chicago	1885
THOMPSON, C. N.*	3017 Michigan Ave., Chicago	1894

*Present.

NAME.	ADDRESS.	ELECTED.
THOMPSON, G. W.*	Quincy	1894
TIBBETTS, C. J	Quincy	1882
TOBEY, W. W.*	Danville	1889
TOWNSEND, H. H.*	Pontiac	1871
TROMPEN, C. N	Roseland	1892
TULLER, R. B	946 West Madison St., Chicago	1892
WALTZ, A. S.*	Decatur	1877
WARNER, E. R.*	Chicago	1882
WASSALL, J. W	208 Dearborn Ave., Chicago	1882
WEST, C. H.*	Farina	1892
WIDENHAM, J. C *	Jacksonville	1874
WIKOFF, B. D	Masonic Temple, Chicago	1888
WILLIS, A. S*	Pana	1894
WONDERLY, T. G	Galena	1881
WOOLLEY, J. H.*	70 Dearborn St., Chicago	1877
YORKER, F. A	48 43d St., Chicago	1892

CORRESPONDING MEMBERS.

ANDERSON, ELI W	15½ E. Washington St., Indianapolis, Ind.	1887
BALDWIN, C. V	Los Angeles, Cal	1885
BARRETT, W. C	208 Franklin St., Buffalo N. Y	1881
BOWMAN, G. A	2602 Locust St., St. Louis, Mo	1881
BRONSON, GEO. A	3201 Washington Ave., St. Louis, Mo	1881
COCHRAN, R. L	Burlington, Iowa	1885
CUNNINGHAM, GEO	2 King's Parade, Cambridge, England	1888
DEAN, F. W	Des Moines, Iowa	1884
FRENCH, D. GALE	Pittsburgh, Pa	1881
FULLER, A. H.*	Columbia Building, St. Louis, Mo	1880
GREVERS, J. E	13 Oude Turf Markt, Amsterdam, Holland	1888
HARPER, JOHN G.*	800 Pine St., St. Louis, Mo	1892
HUGHES, E. E	Des Moines, Iowa	1885
HURTT, J. M	Pomona, Cal	1890
LEVETT, M. M	10 Boul. des Capucines, Paris, France	1888
MAGITÔT, E	8 Rue des Saintes Pères, Paris, France	1888
MOODY, J. D	Los Angeles, Cal	1894
MOODY, KATE C	Los Angeles, Cal	1894
MORRISON, JOHN B	9 When Block, Indianapolis, Ind	1882
PATRICK, GEO	Bolton, England	1890
REED, J. W	Butte City, Mont	1883
REED, THOS. W	Macon, Mo	1883
SPALDING, C. W	River Point, R. I	1880

*Present.

Name.	Address.	Elected.
Stutenroth, C. W.	Watertown, S. D.	1884
Sylvester, A. H.	2 Sommer Strasse, Berlin, Germany	1888
Templeton, J. G.	Pittsburgh, Pa	1881
Tomes, Charles S.	39 Cavendish Square, London, England	1888
Van Marter, J. G.	81 Via Nazionale, Rome, Italy	1888
Walker, J.	22 Grosvenor St., London, England	1888

Total, 29. Number present, 2.

HONORARY MEMBERS.

Brewer, F. A.	San Francisco, Cal	1869
Butler, C. R.	Cleveland, Ohio	1874
Chase, H. S.	910 Olive St., St. Louis, Mo.	1869
Chittenden, C. C	Madison, Wis.	1872
Crowley, C. Geo.	1358 Lexington Ave., New York City	1885
Hardtner, J.	Springfield, Ill	1877
Ingersoll, L. C.	Keokuk, Iowa	1873
Kulp, W. O.	Davenport, Iowa	1871
Miller, W. D.	46 Voss Strasse, Berlin, Germany	1885
Morrison, James B	1422 Baltimore Ave., Kansas City, Mo.	1869
Morrison, W. N	1401 Washington Ave., St. Louis, Mo.	1871
McKellops, H. J.*.	2630 Washington Ave., St. Louis, Mo	1868
Porre, R. J.	278 Race St., Cincinnati, Ohio.	1868
Rathbun, R. S.	Clinton, Iowa	1872
Taft, J.	122 West 7th St., Cincinnati, Ohio	1874
Wilson, I. P.	Burlington, Iowa	1871

Total, 16. Number present, 1.

ROLL OF HONOR.

"Specially Honored by the Society."

Black, G. V.*.....1889. Cushing, Geo. H.*.....1889.

RESUME.

		Total.	Present.
Active Members in Illinois (except Chicago)	105	186	60
Chicago	81		35
Corresponding Members		29	2
Honorary Members		16	1
		231	98

*Present.

MINUTES

OF THE

ILLINOIS STATE DENTAL SOCIETY.

MEETING OF 1894.

FIRST DAY—TUESDAY, MAY 8—MORNING SESSION.

The thirtieth annual meeting of the Illinois State Dental Society was called to order at 10 o'clock, in the Senate Chamber of the Capitol at Springfield, by the President, Dr. Garrett Newkirk, of Chicago.

Invocation by Dr. Edmund Noyes, of Chicago.

THE PRESIDENT: It affords me great pleasure to introduce to you His Excellency, Hon. John P. Altgeld, Governor of the State of Illinois, who will deliver an Address of Welcome.

The Governor was received with applause. He spoke as follows:

ADDRESS OF WELCOME BY GOVERNOR ALTGELD.

Mr. President and Gentlemen of the Illinois State Dental Society:

I have come here to welcome you to the State Capitol. We are glad to see you here, and I want to congratulate you and your profession in this State upon the fact that you have an organization which, at a meeting of this kind, can call out so many of the leading members of your profession. It is only by organization, by meeting, by comparison, by interchange of experience, by minds rubbing up against minds, that any profession can be placed upon a high basis.

So long as each member of your profession is plodding along by himself, there will be some distinguished men in it. There will be some who are full of ambition and fire, and these men will experiment and endeavor to advance your profession, and you will be the gainers by such original work; but the great body of the profession will lag behind, they will not attain that high standing and command

that universal respect that they ought and could. You should all work and pull together. This is as true of the medical and legal professions as it is of your profession.

I can remember the time when dentistry was regarded with indifference, but it has advanced since that time, nd is now recognized as one of the most important professions.

I want to say to you, gentlemen, that few of us have any adequate conception of the greatness of our State, and that your organization will attract attention because of the greatness of your State there can be no doubt. Few of us stop to consider that Illinois is the greatest agricultural State in the world, the greatest coal-producing State in the world, and has more railroads in it than any other State in the Union. The dairy product of Illinois in 1892, amounted to $75,600,000. In short, there is not a field of industry or of human endeavor but what Illinois transcends all other States in the Union. In the matter of building cities and founding institutions, and conducting manufactories she leads the way. Her people are intelligent, enterprising and liberal, and there is no reason why the institutions of Illinois should not be the models of the world.

It will be an honor, and it is an honor to be connected with any profession that has a standing in so great a State, and it should be the aim of your organization to stimulate emulation among your members in order to have the dentists of the State to join your society, and to place the literature of your profession on as high a basis as possible, to have your dental schools stirred by the ambition of the young men that enter the profession. and finally place it upon so high a plane that the simple fact of being a dental practitioner in the State of Illinois, will be a certificate of character and of professional standing in every civilized country on the globe. (Applause.)

You have to deal somewhat with the question of legislation to protect your profession, and within certain bounds that seems to be necessary. It is, after all, a question that must be handled with some discretion. You need legislation that will insure a higher order of intelligence on the part of the young men who are embarking in your profession. On the other hand, any legislation which will put a sort of fence around the profession by having a certain amount of ignorance and incompetency on the inside and attempting to shut out new comers on the outside is not wise legislation and should be guarded against. And there is always that thing to be carefully watched. The same thing arises in regard to medical legislation. It comes up frequently. It comes up especially with the older practitioners, with men who graduated some twenty-five years ago from colleges not recognized by the State Board of Health, and now come to Illinois and want to practice here. They find their college is not recognized and they cannot get a license to practice. I have no doubt this is also true of the dental profession. The old practitioners not being well informed theoretically, they find it difficult to pass an examination, it thus happens occasionally that a really competent practitioner is excluded, when there are hundreds practicing who know less than he does. Difficulties of this kind will arise and cannot be avoided. But legislation is necessary and should be along this line—a line of fine discrimination, endeavoring to raise the standard of education, the standard of intelligence, seeing to it that the men who are to represent your profession are men who have a right conception of it.

I feel deeply interested in your profession of this State, and I want to say to you that the educational institutions of this State are the very best in America. The medical profession is gradually gaining ground, it is based on a high plane, so high that the Government of Mexico has provided that any practitioner who holds a license from the State Board of Health of Illinois shall be entitled to practice in that country, and there is no reason why the dental profession should not be placed upon a plane where the mere fact of practicing in Illinois will be a guarantee of the high character and high professional standing wherever anything is known about dentistry. (Applause.)

It has been our custom to tender an informal reception to organizations of this character at the Executive Mansion, and we are always glad to see and greet you. We have extended an invitation to your body to meet us this afternoon from five to seven, thinking that this time would not interfere with your sessions and your business. We want you to bring your wives, daughters and friends with you and to have a good time. (Applause.)

Response by Dr. A. W. Harlan, of Chicago.

Dr. HARLAN SAID: *Your Excellency:*—We are glad to hear your words of welcome to-day, to the representative body of the dental profession of the State of Illinois. We are particularly pleased that you have so accurate a conception of the necessity for maintaining a high standard in our profession. It has been the endeavor of the members of the dental profession of Illinois, organized under the name of the Illinois State Dental Society, to do everything in their power to promote legislation, education, and a love for literature. Because you come in contact with so many organizations here you may be unaware that in 1820 in the United States there were only 300 dental practitioners, and to-day there are nearly 25,000; that there are more than thirty schools devoted to the education of dentists in the United States, all in good standing; that nearly every State in the Union now has a law to protect the public from empiricism; that Illinois after a struggle of many years succeeded in having a dental law enacted in 1881, which has thus far operated very well. At that time, the number of students going from the State of Illinois to other States to obtain an education were few. Less than three per cent of those entering practice were graduates, but through the wise exercise of the duties imposed on the State Board of Dental Examiners, from that time the number of students gradually increased until now there is scarcely a man coming into the State who does not come provided with a well attested diploma certifying to his fitness to practice. We believe with you that it is wise to enact laws to effect the least hardship and we believe that if an equal standard is maintained in every State in the Union, then a certificate ought to enable a member of the profession to go from one State to another without resubmitting to an examination, but at the present time the laws are so diverse in their requirements that that cannot be done.

Regarding what you have said with reference to Illinois taking the lead in many things, I will say that the Transactions of this Society for many years have been and are now looked upon by the profession throughout the world as among the foremost in the United States. Our dental educational institutions in this State rank with the best in the country, and gradually the profession all over the country

have been increasing the standard, until now the requirements for graduation are nearly, if not quite as high, as in other countries. It is true that we have not erected a Chinese wall so far, as has been done in foreign countries. No graduate of any American institution can practice dentistry in England, France, Germany, Russia, or any other country unless he passes an examination in the language of those respective countries. Heretofore in this country we have been admitting graduates even if they could not speak the English language, giving them an examination in their own tongue. If legislation in other countries is continued on those lines, we will have to build a little wall, and compel applicants to pass their examinations in English. English is the language of the country, and we believe that a reciprocity of that kind is reasonable and just.

Thanking you for your kind welcome, we will endeavor to avail ourselves of your cordial invitation and embrace the opportunity to meet you later this afternoon. (Loud applause.)

The roll call showed that forty-one members were present at the opening session.

The Vice-President, Dr. J. W. Cormany, was then called to the chair, and the President, Dr. Newkirk, delivered the annual address.

On motion, the amendments proposed last year and published in the transactions of 1893, were unanimously adopted.

A cablegram from Dr. J. E. Grevers, of Amsterdam, Holland, wishing the Society a profitable meeting, was read by the Secretary, and on motion, the Secretary was instructed to acknowledge receipt and to return thanks to Dr. Grevers, by letter under the seal of the Society.

Adjourned.

FIRST DAY—Afternoon Session.

The meeting was called to order at 2:30 by the President.

The minutes of the last session were read and approved.

The report of the "Committee on Dental Science and Literature" was read by Dr. A. W. Harlan, of Chicago.

This was discussed by Drs. Koch, Woolley, Gilmer, Noyes, Taylor, Cushing, Brophy and Cormany, and closed by the essayist,

On motion, the subject was passed.

On motion, the Committee on "Dental Art and Invention" was granted further time in which to complete its report.

Dr. T. W. Prichett, of Whitehall, read a paper entitled "Amalgam Fillings."

The discussion was opened by Dr. Swain, who was followed by Drs. Magill, Koch, Black, Woolley, Matteson (A. E.), Crissman and Noyes.

On motion, adjourned.

From 5 to 7 P. M. the members of the Society and their friends were received informally at the Executive Mansion by the Hon. and Mrs. John P. Altgeld.

SECOND DAY—WEDNESDAY, MAY 9.

The forenoon was devoted to clinics. (See report of the Supervisor of Clinics.)

AFTERNOON SESSION.

The meeting was called to order by Dr. Newkirk, the President, at 2:30 o'clock.

The minutes of the previous session were read and approved.

The discussion on Dr. Prichett's paper entitled "Amalgam Fillings" was then continued by Drs. Stevens, Skidmore, Gilmer, Ames, Taylor, Cormany, Freeman (A. W.), McIntosh, Koch, McKellops, Noyes, Sitherwood, Townsend, West, Gallie, Harlan and Green, and closed by the essayist. On motion, the subject was passed.

Dr. J. N. Crouse, of Chicago, then addressed the Society on the subject of the "Dental Protective Association."

On motion of Dr. Noyes a committee was appointed to assist Dr. Crouse in securing subscribers to the capital stock in the "Dental Protective Supply Company," and in securing new members for the "Dental Protective Association." The motion was carried. The President appointed Drs. E. D. Swain, Edmund Noyes, F. H. McIntosh, T. W. Pritchett and C. B. Rohland as such committee.

On motion, a recess of fifteen minutes was then taken, to give the members an opportunity to subscribe for shares of the "Dental Protective Supply Company."

On motion, adjourned.

Evening Session

The meeting was called to order at 8 o'clock by the President, Dr. Newkirk.

The minutes of the previous session were read and approved.

An invitation to attend the meeting of the American Dental Society of Europe at Geneva, Switzerland, August 6, 7 and 8, 1894, was then read.

The Secretary read a request from the Illinois State Historical Society expressing a desire to purchase, or accept as donation, "any and all books, pamphlets, manuscripts, monographs, writing and other materials of historical interest and useful to the historian bearing upon the political, physical, religious or social history of the State of Illinois from the earliest known period of time."

A resolution, offered by Dr. Koch, relating to the care and preservation of the Lincoln monument on part of the State of Illinois (see minutes of the Executive Council), as introduced and adopted by the Executive Council, was then read, and on motion it was unanimously adopted.

The privileges of the floor were then granted to Dr. George A. McMillen, President of the Illinois State Board of Dental Examiners, who briefly explained the attitude of the Board toward

the illegal practitioners in this State. He also requested that any violations of the law governing the practice of dentistry in the State be reported to members of the Board, and that such cases would be investigated and dealt with according to law.

Dr. W. V. B. Ames read the report of the "Committee on Dental Art and Invention."

The report was discussed by Drs. Stevens, Black, Munroe and Green.

On motion, the subject was passed.

Dr. A. H. Peck, of Chicago, read a paper, entitled, "Etiology of Dental Caries."

The discussion was opened by Dr. G. V. Black, of Jacksonville.

On motion, adjourned.

THIRD DAY—THURSDAY, MAY 10.

The forenoon was devoted to Clinics. (See report of the Supervisor of Clinics.)

AFTERNOON SESSION.

The meeting was called to order at 2:30 o'clock, the President, Dr. Newkirk, in the chair.

The minutes of the previous session were read and approved.

Tbe Secretary made the following announcements:

Elections and appointments made by the Council.

Meeting of the First District Dental Society of Illinois, will be held at Peoria, September, 11 and 12, 1894. The members of this society are cordially invited to attend.

That Dr. H. J. McKellops, of 2631 Washington Avenue, St. Louis, Mo., desires copies of all books, pamphlets, periodicals, etc., relating to dentistry, and that he will pay for anything in that line that is not already in his library.

The discussion of the paper of Dr. A. H. Peck, entitled, "Etiology of Dental Caries," was then taken up by Dr. Edmund Noyes, followed by Drs. Dennis (Geo. J.), Taylor, Black, McKellops, Freeman (A. W.), and closed by the essayist.

On motion, the subject was passed.

Dr. T. W. Brophy read a paper, entitled, "The Relation of the Profession to our Dental Colleges."

The discussion was opened by Dr. R. N. Laurance, of Lincoln, who was followed by Drs. Rohland, Koch, Johnson, Noyes, Stevens, Taylor, and closed by the essayist.

On motion, the subject was passed.

Dr. J. W. Cormany, the Vice President being called to the chair, Dr. Geo. D. Sitherwood, of Bloomington read a paper entitled "Swaged Aluminum Plates."

Dr. Brophy announced the appointment of Dr. A. W. Harlan as a member of the State Board of Dental Examiners of Illinois. Amid long continued applause Dr. Harlan was called for. He thanked the Society for the manifest approval of the Governor's action.

The discussion of Dr. Sitherwood's paper was then opened by Dr. Grafton Munroe, of Springfield, and continued by Drs. Freeman (A. W.), Woolley, Stevens, Staley, and closed by the essayist.

The President appointed Drs. Thomas L. Gilmer, C. B. Rohland and J. Campbell, a Committee on the Nomination of Candidates for the Executive Council.

The report of the "Committee on Necrology" was called for, and Dr. G. V. Black, the Chairman, presented and read suitable

resolutions relating to the death Drs. William Henry Eames, of St. Louis, Mo., and Charles K. Sawyer, of Jacksonville, Ill. Dr. G. V. Black then paid a tribute to the memory of his life-long friend, Dr. Eames.

On motion, the report was adopted and the resolutions ordered spread on the minutes of the Society.

On motion, adjourned.

Evening Session.

The meeting was called to order at 8 o'clock. The President, Dr. Newkirk, in the chair.

The minutes of the previous session were read and approved.

Dr. C. S. Case, of Chicago, read a paper entitled "Reciprocating Force in Orthodontia."

The discussion was opened by Dr. A. E. Matteson, of Chicago, and continued by Drs. Black, Rohland, Sitherwood, Crouse, Gilmer, and closed by the essayist.

On motion, adjourned.

FOURTH DAY—FRIDAY, MAY 11.

The meeting was called to order at 9:30 by the President, Dr. Newkirk.

The minutes of the previous session were read and approved.

The "Report of the Supervisor of Clinics" was read by Dr. A. H. Peck, of Chicago.

This was discussed by Dr. J. W. Cormany, of Mt. Carroll, and the subject was, on motion, passed.

A paper entitled, "Operative Dentistry," by Dr. J. J. Jennelle, of Cairo,-was then read by Dr. C. N. Johnson, Chairman of the Executive Committee.

The discussion was opened by Dr. Geo. H. Cushing, of Chicago, who was followed by Drs. Townsend, Allen, Black, Woolley, Taylor and Sitherwood.

On motion, the subject was passed.

The Nominating Committee reported the names of Geo. H. Cushing, E. H. Allen and A. S. Waltz, for members of the Executive Council.

The Society by unanimous vote concurred in the recommendation of the Committee.

The Society proceeded to the election of President and Vice President with the following result:

J. W. Cormany, Mt. Carroll, President; S. F. Duncan, Joliet, Vice President.

The President appointed Drs. Taylor and Allen to escort the newly elected President to the chair.

The installation of officers being proceeded with, the retiring President said:

I feel under great obligations to the members of this Society for their coöperation during the meeting. The position of President has been made very easy for me; in fact, I think the chief difficulty has been in maintaining the dignity of the position whenever things have occurred during the meeting that were amusing to me.

As we go from this meeting, I hope we shall all be imbued with the spirit of faithfulness, that we will try to exercise an influence over all with whom we come in contact, to bring them into the Society and to cultivate the habit of being here throughout the meeting. It is not that a person should occupy an official position which makes this of the greatest importance. The mere presence of a member of the Society at all of its sessions is a very important thing, and I fear some of the members do not properly appreciate this. If a member attends all of the meetings year after year, he is doing an inestimable service to the Society, whether he occupies an important position or not.

Permit me again to thank you for your hearty and cordial assistance throughout the meeting. I bid you all good bye, and will now give way to my successor, Dr. Cormany. (Applause.)

Dr. Cormany was received with applause. He said:

Ladies and Gentlemen:

I feel extremely proud on this occasion, and to be elected on the first ballot is a compliment which I duly appreciate. I shall leave nothing undone to make our next meeting a grand success. (Applause.)

The President appointed the following Publication Committee: Drs. Louis Ottofy, A. W. Harlan and Edmund Noyes.

During the four days meeting the Secretary at various times announced the following as having been elected to active membership by the Executive Council:

Baker, Hester J., D. D. S., Quincy.
Case, C. S., M. D., D. D. S., Chicago.
Childs, T. S., D. D. S., Decatur.
Cook, Geo. W., D. D. S., Chicago.
Evey, D. H., D. D. S., Monmouth.
Gallie, D. M., D. D. S., Chicago.
Hebert, A. W., D. D. S., Chicago.
James, Chas. W., D. D. S., Oak Park.
Leake, C. W., Chicago.
Newsome, B., D. D. S., Minonk.
Nyman, J. E., D. D. S., Chicago.
Pfeifer, Josephine D., D. D. S., Chicago.
Powell, C. B., Jacksonville.
Rice, S. T., D. D. S., Barry.
Staley, H. Reid, D. D. S., Lanark.
Thompson, C. N., D. D. S., Chicago.
Thompson, G. W., Quincy.
Willis, A. S., D. D. S., Pana.

For corresponding membership: Moody, J. D., D. D. S., and Moody, Kate C., D. D. S., both of Los Angeles, Cal.

The minutes of the present session were read and approved.

On motion, the Society adjourned to meet at Galesburg, Tuesday, May 14, 1895.

LOUIS OTTOFY, *Secretary.*

1894.

PROCEEDINGS

OF THE

EXECUTIVE COUNCIL,

ILLINOIS STATE DENTAL SOCIETY.

TUESDAY, MAY 8—First Meeting.

The Executive Council met at the Capitol at 9 A. M. Present: Cushing, Allen, Johnson, Newkirk, Stevens, Duncan and Ottofy.

The report of the Executive Committee was presented by Dr. Johnson, who offered the programme as printed, supplemented by a few changes.

On motion, adopted.

The librarian, Dr. F. H. McIntosh, of Bloomington, wrote that nothing requiring a report has transpired during the year.

The report of the Publication Committee was then read, and on motion, adopted:

REPORT OF THE PUBLICATION COMMITTEE.

Springfield, May 8, 1894.

Mr. President and Gentlemen:

In pursuance of an agreement made between the Publication Committees of the Illinois and the Iowa State Dental Societies, the transactions of the union meeting held last year at Rock Island, were published separately for each society. Each of the publications, however, contains a full report of the papers read, the discussions, reports of committees, clinics, etc., and also the minutes of the meetings that were held jointly. While the minutes of each of the societies held separately, are published only in each respective volume.

The Iowa State Dental Society authorized the Chairman of the Publication Committee of this society to supervise the publication of its transactions, and this request was complied with.

Your committee arranged with *The Dental Review Co.*, H. D. Justi & Son, publishers, to publish such portions of the Transactions of 1893, as they desired, in *The Dental Review*, and in consideration therefor H. D. Justi & Son paid all of the expenses of the publication, except $100.

Two hundred and fifty copies were bound in cloth, and one hundred and fifty in paper. Cost of postage, delivery, etc., is included in the accounts of the Secretary. About seventy-five copies are still on hand, after distribution to those members who are entitled to them, to colleges, dental periodicals, etc.

Respectfully submitted, LOUIS OTTOFY,
A. W. HARLAN,
EDMUND NOYES,
Publication Committee.

The Secretary and Treasurer then presented their annual reports, which were read and referred to the Auditing Committee.

SECRETARY'S REPORT.

SPRINGFIELD, May 8, 1894.

Mr. President and Gentlemen:

Your Secretary presents the following annual report:

Total active membership at beginning of last meeting	166
New members elected	10
Placed on roll by order of the Board of Censors	1
	— 11
Total at close of meeting	177

There have been lost by nonpayment of dues:

G. W. Dennis, of LaSalle.
G. N. Gilbert, of Pana.
E. J. Greene, of Peoria.
J. S. Gunnell, of Normal.
J. M. Lionberger, of Dallas City.
F. J. Raymond, of Canton.
A. C. Schadel, of Warren.
C. Stoddard Smith, of Chicago.
R. E. Tobey, of Pana.

Total	9
Leaving the present membership	168

The number of honorary members is decreased from 17 by the loss of the lamented W. H. Eames, to 16

By the removal of Dr. C. S. Case into the State, necessitating the erasure of his name from the list of corresponding members, their number is decreased from 28 to 27

Total 43

The following is a report of moneys received since the last annual report:

Dues received at last meeting	$220 00
Dues received from close of last meeting to date	364 00
Received from the Iowa State Dental Society	1 50
Sold one copy of the Transaction of 1893	1 00
	$586 50

For which the Treasurer's receipts are herewith submitted.

LOUIS OTTOFY, Secretary.

Audited and found correct:

GEO. H. CUSHING,
C. N. JOHNSON,
S. F. DUNCAN,
} Auditing Committee.

TREASURER'S REPORT.

To the Executive Council:

1893—Dr.		
May 9.	To balance last Report	$307 53
" 23.	Received from Secretary	221 50
1894—May 9.	" " "	365 00
		$894 03
1893—Cr.	Paid out as follows:	
May 11.	Order 122, Secretary's salary	$100 00
" 12.	" 123, Expenses of Executive Committee	35 30
" 25.	" 124, Stenographer's services	100 00
July 24.	" 125, W. O. Kulp (account broken chair)	17 39
1894—April 26.	" 126, H. D. Justi & Son (Transactions)	100 00
" 27.	" 127, Geo. T. Halla (printing programmes, etc.)	60 31
May 6.	" 128, Louis Ottofy (postage on Transactions and Secretary's expenses)	52 08
		$465 08
Balance		$428 95

W. A. STEVENS, Treasurer.

Audited and found correct:

GEO. H. CUSHING,
C. N. JOHNSON,
S. F. DUNCAN,
} Auditing Committee.

The President appointed Drs. Cushing, Duncan and Johnson to act as the Auditing Committee.

On motion, Drs. G. V. Black, C. B. Rohland and Thomas. L. Gilmer were appointed a Committee on Necrology.

On motion, adjourned.

Second Meeting.

Present: Newkirk, Waltz, Johnson, Robbins, Cushing, Duncan, Allen, Stevens and Ottofy.

The minutes of the last meeting were read and approved.

The Auditing Committee reported that it had examined the reports of the Secretary and Treasurer and had found them correct.

The report was adopted.

The Treasurer was instructed to pay all properly authenticated bills.

After some discussion relating to the general welfare of the society, on motion, adjourned.

Third Meeting.

Present: Stevens, Cushing, Allen, Waltz, Johnson, Newkirk and Ottofy.

The following named persons were proposed for membership by the Board of Examiners:

Don M. Gallie, D. D. S., Chicago; C. N. Thompson, D. D. S., Chicago; Chas. W. James, D. D. S., Oak Park, and H. Reid Staley, D. D. S., of Lanark.

These names having been duly posted, they were voted on and all were elected.

On motion, adjourned.

WEDNESDAY, MAY 9.—First Meeting.

Present: Allen, Johnson, Cushing, Robbins, Stone, Duncan, Stevens, Waltz, Newkirk and Ottofy.

The minutes of the two previous meetings were then read and approved.

The resignation of Dr. G. W. Entsminger, of Carbondale, from membership on the Executive Committee was then read and on motion, accepted.

On motion, Dr. J. N. Crouse was granted the privileges of the floor for a period of thirty minutes immediately following the discussion on Dr. Pritchett's paper.

On motion, adjourned.

Second Meeting.

Present: Johnson, Cushing, Robbins, Stone, Duncan, Stevens, Allen, Waltz, Newkirk and Ottofy.

The minutes of the previous meeting were read and approved.

The following named persons were proposed for membership by the Board of Examiners:

C. S. Case, M. D., D. D. S., of Chicago; Geo. W. Cook, D. D. S., of Chicago; J. E. Nyman, D. D. S., of Chicago; A. W. Hebert, D. D. S., of Chicago; Josephine D. Pfeifer, D. D. S., of Chicago; S. T. Rice, D. D. S., of Barry; Hester J. Baker, D. D. S., of Quincy; G. W. Thompson, of Quincy and A. S. Willis, D. D. S., of Pana.

These names having been duly posted, they were voted on, and all were elected.

On motion, a communication received from the Illinois State Historical Library was ordered read before the Society.

The following resolution presented by Dr. Koch was introduced by Dr. Geo. H. Cushing:

Whereas it is the sense of the Illinois State Dental Society in common with numerous other citizens of this State, that the present condition of the monument erected to commemorate the immortal Lincoln, at Springfield, is a reproach and disgrace to our State, be it

Resolved: That we most respectfully petition his Excellency, Governor Altgeld and the members of the next legislature to secure the necessary legislation

for the State of Illinois to accept this monument from the trustees now holding the same, to complete the structure, to maintain and preserve it thereafter, to be visited by whosoever desires, without subjecting him to the humiliation of paying a fee.

The resolution was unaminously adopted by the Council and ordered read before the society and recommended for adoption.

The Illinois State Board of Dental Examiners, by its President, Dr. Geo. A. McMillen, of Alton, requested the privileges of the floor to address the meeting regarding the attitude of the Board toward illegal practitioners.

On motion, the request was granted, and ten minutes allotted for this purpose.

The following named were elected officers for the ensuing year:

Secretary, Louis Ottofy; Treasurer, W. A. Stevens; Librarian, F. H. McIntosh.

The incoming President was appointed to deliver the next annual address.

Dr. E. H. Allen, of Freeport, offered his resignation as a member of the Committee on "Dental Art and Invention."

On motion, the resignation was accepted.

It was moved and seconded that in the standing resolution relating to the Committee on "Dental Art and Invention," the word "three" should be stricken out and the word "one" substituted therefor, the Committee on "Dental Art and Invention" to consist of "one" instead of "three" members. The term of office shall be one year.

Unanimously carried.

On motion of Dr. Ottofy, the following resolution was adopted:

Resolved, that the members of each Publication Committee shall have the power to make such arrangements as in their judgment they deem proper, looking toward the publication of the transactions for the succeeding year.

On motion, adjourned.

THIRD MEETING

Present: Johnson, Allen, Robbins, Duncan, Stone, Waltz, Stevens, Newkirk and Ottofy.

The minutes of the previous meeting were read and approved.

There being no business, on motion, adjourned.

THURSDAY, MAY 10.—FIRST MEETING.

Present: Newkirk, Waltz, Cushing, Johnson, Robbins, Duncan, Blair, Stevens and Ottofy.

The minutes of the previous meeting were read and approved.

The following named persons were proposed for membership by the Board of Examiners:

T. S. Childs, D. D. S., of Decatur and C. B. Powell, of Jacksonville.

These names having been duly posted during one session, they were voted on, and all were elected.

The following amendments to the By-Laws were offered:

Amend Article III. by striking out at the beginning of line seven, in line eight and line nine the words: "One member of."

Amend Article IV. by striking out the present title and substituting therefor the following title: "Executive Committee, and duties of the same."

Amend Article IV., line one, by striking out the words: "The Executive Committee shall" and substituting therefor the words: "There shall be an Executive Committee of one to be appointed by the Executive Council annually, whose duty shall be to."

A. S. WALTZ,
GARRETT NEWKIRK,
C. N. JOHNSON,
LOUIS OTTOFY,
E. K. BLAIR.

[The purpose of these amendments, if adopted, is to reduce the membership of the Executive Committee from "three" to "one."]

The Secretary was instructed to make necessary announcements.

On motion, the bonds of the Secretary and Treasurer were fixed at $500 each, and the President was appointed the custodian of the same.

The following appointments were then made:

A. H. Peck to fill the vacancy on the Executive Committee caused by the resignation of G. W. Entsminger, of Carbondale.

Board of Examiners: T. W. Pritchett, Whitehall.

Committee on Infractions of the Code of Ethics: S. A. Campbell, Mattoon; D. E. Coulson, Galesburg; W. E. Holland, Jerseyville.

Supervisor of Clinics: C. R. Taylor, Streator.

On motion, adjourned.

Second Meeting.

Present: Johnson, Cushing, Allen, Duncan, Stone, Stevens, Robbins, Newkirk and Ottofy.

The minutes of the previous meeting were read and approved.

On motion, Galesburg was selected for the next place of meeting.

The following were appointed to constitute the Local Committee of Arrangements:

Drs. E. C. Stone, J. A. W. Davis and D. E. Coulson, all of Galesburg.

Dr. F. H. McIntosh tendered his resignation as Librarian of the Society.

On motion, the resignation was accepted.

Dr. Grafton Munroe, of Springfield, was, on motion, elected Librarian.

The bonds of the Secretary and Treasurer were read, and on motion, approved and accepted.

On motion, adjourned.

THIRD MEETING.

Present: Newkirk, Cushing, Johnson, Waltz, Blair, Stevens, Duncan, Robbins, Stone, Allen and Ottofy.

The minutes of the previous meeting were read and approved.

The following vote of thanks was, on motion, adopted:

The Illinois State Dental Society desires to extend sincere thanks to Gov. John P. Altgeld for his cordial welcome to the city, to Mr. and Mrs. Altgeld for the courtesies extended by tendering a reception at the Executive Mansion, to the members of the society and their friends.

To the Secretary of State for the use of the Senate Chamber, to the hotels and railroads for reduced rates, and to the local committee of arrangements for their prompt and constant attention to our wants.

FRIDAY, MAY 11—FIRST MEETING.

Present: Cushing, Johnson, Duncan, Allen, Stone, Newkirk, and Ottofy.

The minutes of the previous meeting were read and approved.

The following named persons were proposed for membership by the Board of Examiners:

D. H. Evey, D. D. S., of Monmouth; C. W. Leake, of Chicago.

And for Corresponding Membership:

J. D. Moody, D. D. S., and Kate C. Moody, D. D. S., both of Los Angeles, Cal.

These names having been duly posted during one session, they were voted on and all were elected.

On motion, adjourned.

The usual salary of $100 was voted to the Secretary.

On motion, adjourned.

SECOND MEETING.

Present: Cushing, Duncan, Allen, Johnson, Blair, Waltz, Ottofy, and the newly elected President, Dr. Cormany.

The minutes of the previous meeting were read and approved.

The following named person was proposed for membership by the Board of Examiners:

B. Newsome, D. D. S., of Minonk.

This name having been duly posted during one session, was voted on, and the candidate elected.

On motion, adjourned.

LOUIS OTTOFY, *Secretary.*

OBITUARY.

William Henry Eames, D. D. S.

Died at St. Louis, Mo., March 29, 1894, William Henry Eames, D. D. S.

Resolved, That in the death of Dr. W. H. Eames, the Illinois State Dental Society loses one of its most valued honorary members. Although living in a sister State, and being constantly engaged in the dental organizations of his own commonwealth, he has also been actively engaged in the work of this society almost from its inception having frequently contributed valuable papers to its proceedings and rarely failing in attendance upon its meetings.

Resolved, That a page in our proceedings be set apart to the memory of our departed friend and benefactor, and that a copy of the proceedings be presented to his family, and with it an expression of our deep sympathy with them in their bereavement.

G. V. Black,
Thos. L. Gilmer,
C. B. Rohland,
Committee.

Dr. Black then said: I desire to say a few words in regard to Dr. Eames. We were associated very much during our lives. I have been at his home with his family and himself for weeks together, and I knew him at home, as well as in college work. I knew him in societies and in his office. I always found him genial, companionable, liberal with his time and money, and liberal in work and study. When I have been at his house nothing was too good for me. No trouble was too much for my comfort. I have met many members of the dental profession at his house.

When Dr. Eames removed to St. Louis he immediately engaged in the work of his profession there. The St. Louis Dental Society had already been organized and was in shape. He at once became a member of it and it was at his house that the first step for the organization of the Missouri Dental College was taken, and it was largely through his efforts that this organization was effected. From that time to the time of his death he was continuously engaged in the work of that school, and devoted his energies in the direction of the work. We owe to Dr. Eames very much of what we now are able to do in the way of college teaching, more, perhaps, than many of us have thought. He was always very straightforward, careful and conscientious in his college work. One circumstance, perhaps, will show the bent of the man's mind, and the care with which his work was always done more than any words I may utter to you.

I was engaged with him in college work. It was in that college that I did my first teaching. For three years I lectured in that college, and I think I gave no lecture during all that time in which Dr. Eames was not upon the seats. He was always there. The incident I wish to allude to was this, to show the firmness and care with which he conducted the affairs of the school. It happened in the 70's, during a financial panic, when as many of our older members know, the question of finances was simply a terrible one with many. Dr. Judd was just leaving the school. Others were leaving the school on account of financial considerations. Schools all over the country were suffering, and loose methods

were resorted to by many schools. Just at this time, when Dr. Eames hardly knew which way to look for the beginning of the school the next year, or paying the bills of the term just ended, or of paying his own individual bills, there came a proposition to him from a State society to grant diplomas for a selection of members which constituted almost the whole State society, with the fee for each diploma. The proposition was considered and squarely refused, at a time when the granting of diplomas was almost promiscuous, as we look back at it to-day. I will say again by the firmness of this example we owe a great deal to Dr. Eames, who did considerable in preparing the way for dental laws, and for the success of the schools of to-day.

Then, in dental journalism he was the assistant editor of the *Missouri Dental Journal* at its beginning, and connected with it most of the years of its existence. After Prof. Judd retired he became its principal editor, and conducted it for many years. In this way he has contributed to our advancement. He was also connected with society work continuously all of these years, and in the societies of his own State he had a controlling voice generally in their management. At the time when I was a member of the Missouri State Dental Association, and I attended tis meetings for many years, he seemed to have a marked influence in controlling and directing the members, thus assisting and helping in this character of work continuously.

Personally, Dr. Eames was one of the smoothest and evenest tempered of men. You never would see him angry, never see him ruffled; he always spoke kindly, often firmly, but with friendship for all. The last act of his life was his attendance upon a faculty meeting of his school After the meeting he took dinner with some of his friends, then went to the house of his daughter, and shortly after retired for the night. In the morning he did not come down to breakfast. A messenger was sent to his room, and he was found in a helpless condition He did not speak afterward. He had been smitten with paralysis during the night, from which he soon died, and he has passed from among us forever; but a man who has done such noble and continuous work for the profession as Dr. Eames, cannot be forgotten.

Charles K. Sawyer.

Dr. Charles K. Sawyer died December 20, 1893, aged 72.

Dr. Sawyer, of Jacksonville, Ill., was for many years an active member of the Illinois State Dental Society, but finally dropped out on account of failing health, and ceased to practice in 1882, since which time his health was very poor up to the time of his death.

Dr. Sawyer was a useful practitioner, much revered by a large circle of friends, and in his disability and final death this Society has lost a genial and useful member.

Resolved, That a page in our Transactions be set apart to his memory and a copy of the Transaction sent to his family with the sincere sympathy of this Society in their bereavement.

G. V. Black,
Thos. L. Gilmer,
C. B. Rohland. } *Committee.*

IN MEMORIAM.

AUSTIN, J. F.
BAKER, D. B.
DAVIS, E. F.
DEAN, M. S.
EAMES, W. H.
FORBES, ISAIAH.
GEORGE, ISAAC.
HAND, M. F.
HARRINGTON, G. H.
HAWXHURST, D. C.
HENDEL, J. W.
JUDD, HOMER.
KEELY, GEORGE W.
LEWIS, C. W.
LEWIS, H. N.
MORRISON, A. M.
PARK, EDGAR.
REYNOLDS, J. S.
RIVERS, C. W.
SAWYER, CHARLES K.
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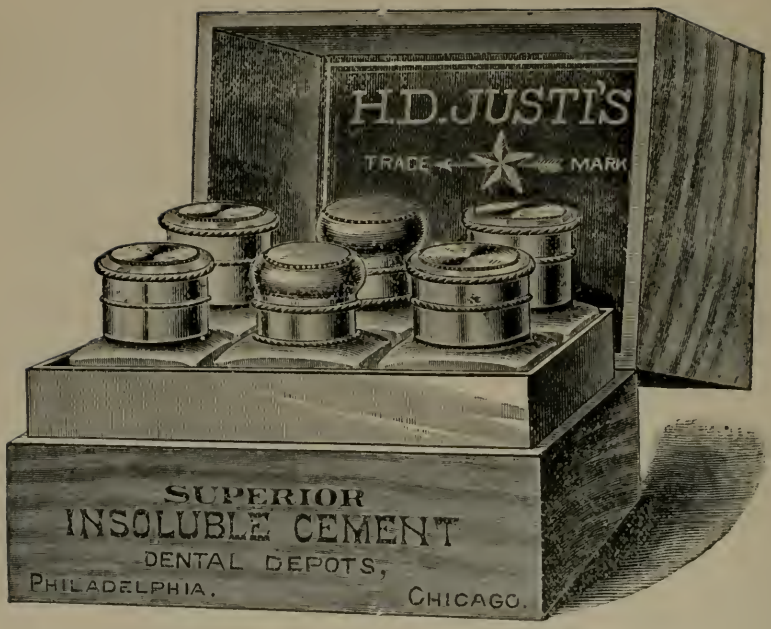
Philadelphia. Chicago.



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